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Sharif M.I. Hossain
Population Council

Saumya RamaRao
Population Council

Ismat Ara Hena
Population Council

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Recommended Citation

Hossain, Sharif M.I., Saumya RamaRao, Ismat Ara Hena, and Ubaidur Rob. 2014. "Maternal health commodity landscaping exercise: A snapshot of the Bangladesh program," Final report. Dhaka: Population Council.

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MATERNAL HEALTH COMMODITY LANDSCAPING EXERCISE: A SNAPSHOT OF THE BANGLADESH PROGRAM

Sharif Mohammed Ismail Hossain
Saumya RamaRao
Ismat Ara Hena
Ubaidur Rob

MAY 2014



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Population Council Bangladesh
House 15B, Road 13
Gulshan, Dhaka
Bangladesh
1212
Tel: +880 2 882 1227
Fax: +880 2 882 3127
email: info.bangladesh@popcouncil.org

popcouncil.org

Suggested citation: Hossain, S.M.I., S. RamaRao, I.A. Hena and U. Rob. 2014. “Maternal Health Commodity Landscaping Exercise: A Snapshot of the Bangladesh Program.” Dhaka: Population Council.

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Acknowledgments

Population Council expresses its sincere gratitude to the William and Flora Hewlett Foundation for their interest in and financial support for this national Maternal Health Commodity Landscaping Exercise in Bangladesh.

Population Council is grateful to Dr. Mohammad Sharif, Director of Maternal and Child Health Services and Line Director of Maternal, Child and Reproductive Health of the Directorate General of Family Planning, Mr. Selim Barami, Director of Drug Administration, Ms. Rina Parveen, Director of Planning for the Directorate General of Family Planning, Dr. Md. Altaf Hossain, Program Manager for Neonatal Health of the Directorate General of Health Services, and Dr. Tapash Ranjan Das, Deputy Director of the Directorate General of Family Planning's Maternal and Child Health Unit, for their presence and active participation in a national workshop and for their valuable contributions throughout the exercise.

The Council also expresses its sincere thanks to Professor Latifa Shamsuddin, President of the Obstetrics and Gynecological Society of Bangladesh, and Professor Perveen Fatema, General Secretary of the Obstetrics and Gynecological Society of Bangladesh, for their active participation in the workshop. Being active advocates for improving maternal and perinatal health, both of them contributed significantly to the workshop and provided policy and service delivery guidelines for the future.

We express our sincere gratitude to Mr. Toslim Uddin Khan, General Program Manager of Social Marketing Company, and Mr. Mohammad Golam Kibria, Senior Technical Advisor for Quantification and Monitoring and Information Systems of Systems for Improved Access to Pharmaceuticals and Services, for their informative and thoughtful presentation in the workshop.

We would like to thank the respondents who participated in interviews and provided information, as well as the warehouse staff who permitted us to visit the warehouse and review stocks of the thirteen life-saving commodities.

List of Abbreviations

ANCS	Antenatal Corticosteroids
API	Active Pharmaceutical Ingredient
BP	British Pharmacopoeia
BRAC	Bangladesh Rural Advancement Committee
CC	Community Clinic
cGMP	Current Good Manufacturing Practice
CSBA	Community Skilled Birth Attendant
DD-FP	Deputy Director, Family Planning
DDS	Dietary and Drug Supply
DGDA	Directorate General of Drug Administration
DGFP	Directorate General of Family Planning
DGHS	Directorate General of Health Services
ECP	Emergency Contraceptive Pill
EDL	Essential Drug List
EPh	European Pharmacopeia
EWEC	Every Woman, Every Child
FIGO	Federation of International Gynecologist and Obstetrician
FP	Family Planning
FWA	Family Welfare Assistant
FWV	Family Welfare Visitor
ICDDR,B	International Centre for Diarrhoeal Disease Research, Bangladesh
IM	Intramuscular
IP	International Pharmacopeia
iu	International Unit
IV	Intravenous
kg	Kilogram
mcg	Microgram
MCH	Mother and Child Health
MCHIP	Maternal and Child Health Integrated Program
MCWC	Mother and Child Welfare Center
mg	Milligram
MgSO ₄	Magnesium Sulphate
MH	Maternal Health
ml	Milliliter
MNCH	Maternal, Neonatal and Child Health

MNH	Maternal and Neonatal Health
MoH&FW	Ministry of Health and Family Welfare
NGO	Non-Government Organization
NIH	National Institute of Health (United States)
NTC	National Technical Committee
OGSB	Obstetrics and Gynecological Society of Bangladesh
ORS	Oral Rehydration Salts
PPH	Postpartum Hemorrhage
PPHP	Postpartum Hemorrhage Prevention
PTRDS	Pre-term Respiratory Distress Syndrome
SACMO	Sub-assistant Community Medical Officer
SDG	Service Delivery Guideline
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
SMC	Social Marketing Company
TK.	Taka
UH&FWC	Union Health and Family Welfare Center
UHC	Upazila Health Complex
UN	United Nations
UNCoLSC	UN Commission on Life-Saving Commodities
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USP	United States Pharmacopoeia
WB	World Bank
WHO	World Health Organization

Executive Summary

Despite consistent efforts of the government and national stakeholders, every year in Bangladesh over 5,000 mothers and thousands of children die. Most of these deaths are preventable and could be treated by increased access to quality services including existing medicines and other health commodities. The United Nation's Commission on Life-Saving Commodities for Women and Children suggests that an important cause of these deaths is lack of access and appropriate use of 13 life-saving commodities.

This document describes an effort by Population Council to assess the country's policies, guidelines, and availability for these 13 life-saving commodities as well as engaging with key stakeholders to implement the UN Commission's recommendations in conjunction with this assessment's findings. This assessment validated the availability of the 13 commodities in three districts at district, sub-district, and community levels, and within drug stores, in 15 government facilities and 27 private drug stores in August and September 2013. Key stakeholders (including Ministry of Family Health and Welfare and government officials, members of professional associations, and non-governmental representatives) were consulted. A national workshop stimulated discussion, identified national priorities and information gaps, and identified areas requiring policy review. This stakeholder engagement helped identify opportunities for their organizations' contributions to implementing the UN Commission recommendations.

FINDINGS

Regulatory issues

The assessment determined that Bangladesh has well-developed policies to regulate production, distribution, sale, and use of all drugs as well as ensuring they are of good quality, efficacious, and safe. It is also revealed that all drugs, medicines, and other mechanical substances in final dosage forms (those manufactured, imported, distributed, marketed, or consumed in the country) must be registered with the regulatory authority—the Directorate General of Drug Administration. The registration must specify dosage form and strength, according to the country's Drug Control Committee (a committee of the Directorate General of Drug Administration). The Directorate General of Drug Administration's capacity seems to be logistically limited and lacks skilled manpower, while other regulatory factors including pharmaceutical companies' individual operating procedures, quality control, and quality assurance programs complicate regulatory issues.

Registration and commodity availability

The assessment found that many policymakers and program managers are not aware of the UN Commission report nor its recommendations. Stakeholders who were aware were generally from international and UN organizations and involved in actual implementation of the Commission's recommendations.

With the exception of the female condom, however, each of the 13 life-saving commodities is registered and available in Bangladesh. Not all of maternal and neonatal commodities are registered in the dosage forms recommended by the World Health Organization for their specified indications, nor do service delivery guidelines provide indications for their use.

Availability and shortage need to be addressed. Oxytocin and Misoprostol were not available in two out of three district hospitals visited but were available in all Mother and Child Welfare Centers. Similarly, Misoprostol was not available in any Union Health and Family Welfare Centers or Community Clinics visited.

Although Oxytocin is available and used for induction of labor and preventing postpartum hemorrhage in most district and sub-district facilities (although not in community facilities), consistent lack of cold chain storage necessary for the drug's integrity remains a significant challenge. Many government facilities and most private drug stores lack functioning refrigerators. Often Oxytocin is stored on an open shelf, rendering it ineffective.

Misoprostol is registered in Bangladesh and, in recent years, was introduced and scaled up for postpartum hemorrhage prevention and management at the community level. Service Delivery Guidelines are available for community use. Thus far, 19 out of 64 districts have the Guidelines. Discussions are ongoing to bundle Misoprostol with safe delivery kits.

Magnesium sulphate is registered for prevention and treatment of severe pre-eclampsia and eclampsia, but it was not available in one out of two Mother and Child Welfare Centers and two out of five Upazila Health Complexes visited. Service delivery guidelines are available for community service providers. Community service providers tend to prefer single dose solutions for intramuscular injection in a pilot study underway in two sub-districts and upazilas, rather than other dosages or formulations. Population Council is currently conducting a study to determine whether it is feasible and acceptable for community service providers to administer an intramuscular loading dose of magnesium sulfate before referral.

Several injectable antibiotics, including those recommended by the United Nations Commission, including amoxicillin for treatment of pneumonia, are registered and available in various dosage forms for treating neonatal sepsis and other infectious conditions. Injectable antibiotics were not available in one out of three District Hospitals, no Mother and Child Welfare Centers, nor two out of five Upazila Health Complexes.

Chlorhexidine is registered and available in various dosage forms but not in the concentration necessary for neonatal cord care. Chlorhexidine 7.1% is not included in the country's Essential Drug List or Dietary and Drug Supply Kits, and no Service Delivery Guidelines are available. Although the antenatal corticosteroids dexamethasone and betamethasone are registered and available in the country in various dosage forms, the available dosage forms are not suitable for pre-term respiratory distress syndrome and are not included in the Essential Drug List, and no Service Delivery Guidelines are available.

Encouragingly, the National Core Committee for Neonatal Health of the Directorate General of Health Services and the Directorate General of Family Planning's National Technical Committee have approved piloting and scale up in one district of the required dose of dexamethasone for pre-term respiratory distress syndrome and Chlorhexidine 7.1% for neonatal cord care. Service Delivery Guidelines are being prepared.

Oral rehydration salts and zinc are widely available as over-the-counter products and are used for diarrhea. Both are included in the Essential Drug List, and Service Delivery Guidelines are available.

Resuscitation devices for newborn asphyxia have been distributed to 19 districts. The devices were available in two out of three District Hospitals, one out of two Mother and Child Welfare Centers, three out of five Upazila Health Complexes, two out of four Union Health and Family Welfare Centres, and no Community Clinics visited. Resuscitation devices for newborn asphyxia were not found in any private drug stores.

Two types of contraceptive implants are registered. A single rod implant (Implanon) is registered and used in the government program, while a two rod implant, Jadelle (as I-plant), is registered and marketed in the private sector through Social Marketing Company. These are included in the country's approved contraceptive methods and Service Delivery Guidelines are widely available. Although there is no domestic manufacturing of implants, there were no supply shortages of implants in the facilities visited.

Emergency Contraceptive Pills are registered and have been used in Bangladesh for the last decade as an over-the-counter product, free of cost in the government program. Supplies are obtained from four domestic pharmaceutical companies, as well as imports, yet actual supplies in facilities are inconsistent. Although Emergency Contraceptive Pills were available in private drug stores, the drug was unavailable in government facilities.

The female condom is not registered in Bangladesh, as policymakers and program managers consider it unsuitable for the local context.

Challenges Identified

- Shortages of all essential drugs and commodities in public health facilities;
- Inappropriate storage of oxytocin (and subsequent use of an ineffective drug during crucial medical events) is widespread;
- Unavailability of antenatal corticosteroids in correct dosage forms (6 mg injection) for pre-term respiratory distress syndrome; unavailability of Chlorhexidine in the correct concentration (7.1%) for newborn cord care; provider use of inappropriate concentration; and lack of related Service Delivery Guidelines;
- Unavailability of magnesium sulfate in appropriate dose forms; manufacture of a single loading dose for severe pre-eclampsia and eclampsia is needed, but pharmaceutical companies lack interest;
- Lack of advocacy with pharmaceutical companies for manufacturing less profitable but essential drugs in appropriate dosage forms;
- Lack of awareness of Emergency Contraceptive Pills due to lack of educational efforts;
- Lack of knowledge and low use of zinc sulphate for neonatal diarrhea;
- Absence of a Directorate General of Family Planning forum for advocating for mothers and ensuring access to and use of essential maternal health drugs and commodities.

Opportunities Identified

- All 13 life-saving drugs and commodities are registered (except female condom) in the country in different dosage forms, which means that additional, altered dosage forms is feasible.
- The Directorate General of Drug Administration is very much in favor of ensuring the availability, quality, and affordability of essential maternal and neonatal health drugs and commodities. The Directorate requested an application for the approval of essential drugs in required dose forms. The Directorate General of Family Planning was requested to form an advocacy forum to ensure availability of maternal health drug and commodities, and Systems for Improved Access to Pharmaceuticals and Services supported a Forecasting Working Group in the Directorate. The Directorate General of Health Services has a Supply Chain Coordination Forum that coordinates with the United Nations, World Bank, the Joint United Nations Programme on HIV/AIDS, the Ministry of Family Health and Welfare, and other stakeholders.
- Chlorhexidine has already been approved by the Directorate General of Drug Administration in the appropriate concentration, and the National Core Committee for Neonatal Health of the Directorate General of Health Services and the Directorate General of Family Planning's National Technical Committee have approved its use in the vertical program. Social Marketing Company has reportedly begun manufacturing the drug, and Save the Children is piloting product use in one district.
- The National Core Committee for Neonatal Health of the Directorate General of Health Services and the Directorate General of Family Planning's National Technical Committee have approved the introduction and scale up of dexamethasone sodium sulphate 6 mg intramuscular injection for pre-term respiratory distress syndrome for both facilities and use within communities.
- The Directorate General of Drug Administration has issued a letter for the appropriate storage of oxytocin in all public health facilities. The Directorates General of Health Services and Family Planning have also issued guidance to all facilities.
- Systems for Improved Access to Pharmaceuticals and Services and other stakeholders are facilitating both the Directorate General of Health Services' and the Directorate General of Family Planning's quantification of maternal and neonatal commodities needed for the facility level. The Directorate General of Family Planning

has a logistics management and information system for tracking the 13 recommended commodities, and they have also proposed including Chlorhexidine and misoprostol in standard infant delivery kits.

- Participating respondents are concerned about the unavailability and inappropriate dosage forms of maternal and neonatal commodities, which suggests a wide basis of support for improved commodity availability.
- Participating respondents are concerned about the use of low dose misoprostol for postpartum hemorrhage prevention and treatment.
- Social Marketing Company and EngenderHealth's Mayer Hashi program have initiated training to insert and remove implants through private providers.

Recommendations

For Maternal Health

- Misoprostol should be bundled with birthing delivery kits.
- Manufacture of a single loading dose of the magnesium sulfate solution should be consistently advocated for with pharmaceutical companies.
- Stakeholders suggest an assessment of the effectiveness of 400 mcg versus 600 mcg misoprostol for preventing postpartum hemorrhage among Bangladeshi women.
- Essential drugs and commodities for mothers should be made available at Union Health and Family Welfare Centres where normal vaginal deliveries are planned and conducted.

For Neonatal Health

- Chlorhexidine should be bundled with birthing delivery kits.
- Resuscitation devices should be available in all districts, particularly in all facilities where deliveries are conducted.
- Advocacy should be conducted with pharmaceutical companies for manufacture of a single dose of gentamycin injection and 7.1% Chlorhexidine.
- Essential drugs and commodities for neonates should be made available in Union Health and Family Welfare Centres, where normal vaginal deliveries are planned and conducted.
- Single doses of injectable antibiotics should be manufactured and promoted for neonatal sepsis.
- Educational efforts should be strengthened for increasing awareness of zinc use in diarrheal diseases.

For Family Planning Commodities

- The Directorate General of Family Planning should increase public awareness how to avoid unplanned pregnancies and ensure availability of Emergency Contraception, including provision for field workers.

General recommendations

- A forum at the Directorate General of Family Planning should be formed to advocate for ensuring access to and use of maternal and newborn drugs and commodities.
- Further initiatives are necessary for ensuring drug quality, dosage appropriateness, and reliable availability in both the private and public sectors.
- The Directorates General of Drug Administration, Family Planning, and Health Services should be regularly updated by active stakeholders on global updates in maternal and neonatal health and other public health issues.

Background

The United Nations (UN) Secretary General's Global Strategy for Women's and Children's Health 2010 report highlighted the lack of access to life-saving commodities resulting in preventable deaths of women and children. The Strategy called on the global community to work together to save 16 million lives by 2015 through increasing access to and appropriate use of essential medicines, medical devices and health supplies during pregnancy, childbirth, the postnatal period, and childhood.

The UN secretary General convened the UN Commission on Life-Saving Commodities for Women and Children (the Commission), which is a part of the Every Woman, Every Child movement, with the overall goal of increasing access to life-saving commodities in 50 of the world's poorest countries. The Commission identified and endorsed an initial list of 13 overlooked life-saving commodities that, if more widely accessed and properly used, could save the lives of more than six million women, newborns, and children, including prevention of 1.8 million child deaths annually and 230,000 maternal deaths, through increased access to family planning (FP) around the world. The 13 commodities identified include oxytocin and misoprostol for postpartum hemorrhage (PPH), Magnesium sulphate ($MgSO_4$) for severe pre-eclampsia and eclampsia, injectable antibiotics for newborn sepsis, Antenatal corticosteroids (ANCS) for pre-term respiratory distress syndrome, chlorhexidine for newborn cord care, resuscitation devices for newborn asphyxia, amoxicillin for pneumonia, oral rehydration salts (ORS) and zinc for diarrhea; and female condoms, contraceptive implants, and emergency contraceptive pills (ECPs) for contraception.

The Commission also identified key interrelated barriers that prevent access to and use of the 13 commodities, which severely under-resourced regulatory agencies in low-income countries, leading to delayed registration of commodities; lack of oversight of product quality and general inefficiencies; market failures, where return on investment is too low for encouraging manufacturers to enter the market or produce sufficient quantities; and user supply and demand challenges such as limited demand for the product by end users, local delivery problems, and incorrect prescription and use. To address these challenges and deliver on the promise of saving the lives of millions of women, newborns, and children, the Commission recommended ten actions to be achieved within definite periods of time. These actions focus on the need for improving global and local markets for life-saving commodities, innovative financing, quality strengthening and regulatory efficiency, improved national commodity delivery, and better integration of private sector and consumer needs.

In Bangladesh, 12 of the 13 commodities are registered (except female condoms), but the extent to which these commodities are available at point of prescription and use, their doses and forms, policies for use, client access, and awareness are not widely, particularly at the district level. Furthermore, little is known about health workers' knowledge and technical competencies. Bangladesh's Ministry of Health and Family Welfare (MoHFW) comprises two divisions: the Directorate General of Health Services (DGHS), responsible for ensuring availability of maternal child health drugs, supplements, and devices; and the Directorate General of Family Planning (DGFP), which is responsible for ensuring contraceptive availability. DGFP is also responsible for ensuring availability of maternal child health drugs, supplements, and devices, in addition to contraceptives, at health facilities. The Directorate General of Drug Administration (DGDA) under MoHFW is the country's Drug Regulatory Authority.

Globally, efforts are underway to implement the UN Commission recommendations on Life-Saving Commodities for Women and Children. In an effort to contribute to the Government of Bangladesh's implementation plan for these recommendations, Population Council, with support from the Hewlett Foundation, assessed the availability of the 13 life-saving commodities to provide empirical information for decision making within the country's health sector.

Objective

This assessment's primary objective was to examine the policies, guidelines, and availability for the 13 identified life-saving commodities in Bangladesh as well as engaging with policymakers and program managers in implementing the UN Commission recommendations in light of the assessment's findings. This assessment's findings are expected to be used as to stimulate discussion, identify national priorities and information gaps, influence policy formulation, and increase access to the commodities and assist international advocates for global advocacy. The specific objectives of this exercise are to:

- Engage with national leaders on determining national priorities and information gaps about the 13 maternal and neonatal health products;
- Examine policies and guidelines of the 13 life-saving commodities;
- Explore procurement mechanisms of the 13 life-saving commodities/supplies;
- Explore manufacturing capacity, availability of quality assurance guidelines and policies, product packaging policies, distribution mechanisms, cost to end users and financing;
- Examine access to and availability of the 13 life-saving commodities at public sector facilities at district, sub-district, and community levels, as well as at private drug stores;
- Assess stakeholders' and professional associations' interest and participation in ensuring commodity supplies; and
- Stimulate discussion among decision makers and help identify policy options for increasing commodity access and availability.

Methodology

This Maternal Health Commodity Landscaping Exercise comprised two activities: assessing and providing a comprehensive description of maternal and neonatal health (MNH) commodity issues, from policy formulation to point of care; and engaging stakeholders for implementing the UN Commission recommendations. The study's methodology included a document review of the policies, service guidelines, and availability and use of the 13 life-saving commodities as well as validating the availability of those commodities in district, sub-districts, and community facilities and private drug stores. Stakeholders provided recommendations regarding the areas of assessment along with subsequent discussion of the results and identification of priority actions.

NATIONAL ASSESSMENT

Document review of policies, guidelines, and use of 13 life-saving commodities

Policy documents, policies, service delivery guidelines and circulars were collected and reviewed, complemented by searches for drug manufacturers at www.bddrugs.com and pharmaceutical companies' web sites, as well as www.dgda.gov.bd, the Directorate General of Drug Administration's web site (Appendix 1). These document reviews and searches were further complemented by 21 in-depth interviews with representatives from MoHFW, professional associations and bodies, development partners, pharmaceutical companies, and NGOs, for clarification and greater detail about the drug and commodity landscape in Bangladesh. The findings from these searches and interviews combined to described the availability of the 13 recommended commodities, as well as related policy gaps, existing procurement mechanisms, manufacturing capacity, quality assurance guidelines and policies including product packaging, distribution and logistics, costs for end users, and financing. These activities provided mechanisms for engaging national and regional stakeholders and professional associations in ensuring supplies, identifying national priorities, and information gaps.

Availability of the 13 life-saving commodities

District, sub-district and community public facilities as well as private drug stores were visited to determine if the 13 recommended commodities were available. Public drug stores were also visited to assess commodity availability, stock outs, and drug storage (including humidity and temperature control and refrigeration). A checklist was used to collect this information. Fifteen government facilities from three districts were visited including three District Hospitals, two Maternal and Child Welfare Centers (MCWCs), five Upazila Health Complexes (UHCs), four Union Health and Family Welfare Centers (UH&FWCs), and one Community Clinic (CC). Twenty-seven private drug stores were visited for information on drug availability, indications for which they are sold, and price; 16 of the 27 drug stores were at the district level and 11 were at the sub-district level.

DOCUMENTS REVIEWED

- Drug Policy of the Government of Bangladesh, MoH&FW
 - Quality Manual of Directorate General of Drug Administration, Bangladesh, MoH&FW
 - DGHS and DGFP operation plan 2011-2016, MoH&FW
 - "Training Manual of Use of Misoprostol to Prevent Postpartum Hemorrhage (PPH)," MoH&FW, USAID, EngenderHealth.
 - "Information Kit on Use of Misoprostol to Prevent PPH at Home Delivery," MoH&FW and EngenderHealth
 - "National Protocol for Providing Loading Dose of Magnesium Sulphate (MgSO₄) by the Community Level Service Providers," MoH&FW, Obstetrical and Gynecological Society of Bangladesh (OGSB), EngenderHealth, Maternal and Child Health Integrated Program (MCHIP), and Population Council
 - "Family Planning Manual," Directorate General of Family Planning (DGFP), MoH&FW
 - Trainer's Handbook, "Active Management of Third Stage of Labor," MoH&FW
 - Minutes of National Core Committee, Neonatal Health (NCC-NH), MoH&FW
 - Minutes of National Technical Committee (NTC), DGFP
 - Revised supply manual (2013), DGFP
-

STAKEHOLDER ENGAGEMENT

A half day national workshop on 8 October 2013 in Dhaka with 22 policymakers, program managers, regulators, pharmaceutical industry representatives, and other stakeholders shared and discussed the findings of the assessment and identified priority activities for implementing the UN Commission's recommendations within the Bangladeshi context.

In addition to Population Council's presentation, two other organizations presented information on maternal and neonatal health commodity issues.

The sessions enabled the Council to engage with DGFP, DGHS, and other stakeholders, to sensitize them to the Commission's recommendations and exploring their introduction in Bangladesh, as well as providing an opportunity for developing recommendations that emerged from the workshop and discussing them.



Workshop participants

Results

The findings of this report triangulate the results from the review of policy documents, in-depth interviews, at facility and drug store validation assessments, the validation workshop, and findings from the efforts to engage policy makers, program managers, and other stakeholders in implementation of the UN Commission recommendations.

NATIONAL DRUG POLICY

Drug policies and guidelines

The Directorate General of Drug Administration (DGDA), a division of MoHFW, is Bangladesh's Drug Regulatory Authority. Interviews with DGDA officials revealed that it controls and regulates production, distribution, sale, and use of any drugs in the country. DGDA's primary responsibility is to ensure that drugs are safe, efficacious, and of good quality. The National Drug Policy was formulated in 1982, and currently the Drugs Act 1940 (XXIII of 1940) and Drugs (control) Ordinance 1982 (VIII of 1982) regulates registration, manufacturing, distribution, sale, importation, and exportation of any drugs in Bangladesh.

All drugs, medicines, and other mechanical substances in final dosage forms manufactured, imported, distributed, marketed, or consumed in Bangladesh must be registered with DGDA for the specific dosage form and strength recommended by the Drug Control Committee (of DGDA). An important objective of the National Drug Policy is to make good quality drugs available at affordable prices, and therefore the policy requires quality assurance at different stages—manufacturing, transit, and storage, with testing at different times before it reaches the end user.

Interviews with policy makers and program managers suggest that those responsible for implementing maternal health policies and services were not aware of the specifics of maternal health commodity policies and the UN Commission report and its recommendations. A few stakeholders, particularly the international development organizations and UN agencies, are aware of UN Commissions' recommendations.

Drug registration, indications, dose forms and presentations, and essential drugs list

All 13 life-saving commodities are registered in Bangladesh with the exception of female condoms. Some of the commodities are not registered in the specific dose forms needed for particular MNH conditions or indications. A feasibility and acceptability study of the female condom by Social Marketing Company produced results that were not compelling enough to merit its introduction; policymakers and program managers suggested that the female condom would not have substantial uptake in Bangladesh.

Oxytocin and magnesium sulphate are reported as registered and in use throughout the country for a long time. Oxytocin is registered for induction of labor and PPH prevention and treatment, available in 5 iu/1ml ampoules, for both IM and IV injections, and in tablet form. Only one pharmaceutical company manufactures oxytocin tablet, and it is perceived as less effective than injection for the same indications. Service delivery guidelines (SDGs) for oxytocin are in place and followed in all facilities.

Magnesium sulphate (MgSO_4) is registered for prevention and treatment of severe pre-eclampsia (SPE) and eclampsia and is available at 49.3% w/v in 5 ml ampule (2.46 gm) and 4% w/v in 16.4 mmol or 4.0 gm/100 ml solution for injection and infusion (IV/IM) forms (Table 3a and Table 3b). Although MgSO_4 is registered and used for preventing and treating SPE and eclampsia, it is not available for this



Oxytocin supply at a facility



Oxytocin tablets

indication as a single loading dose (10 mg IV/IM) at the community level. Two studies, at the request of the National Technical Committee, are operationalizing and assessing the ability of community service providers to detect, prevent, and treat SPE and eclampsia with a single loading dose of MgSO₄ before referral. Magnesium sulfate SDGs, for use by providers in community facilities, have been developed by MoHFW, the Obstetrical and Gynecological Society of Bangladesh, EngenderHealth, and Save the Children, and are being tested¹.

Misoprostol is registered, in two tablet dose forms (100 mcg, and 200 mcg), for gastrointestinal indications. Recently manufacturers' brochures have included indications such as labor induction, PPH prevention and treatment, abortion induction, abortion incompleteness, miscarriage, postabortion care, and intrauterine fetal death for which cervical ripening or softening is required.

Although WHO, FIGO, and other professional bodies have recommended 600 mcg of Misoprostol for PPH prevention and management, the dosage approved by the National Technical Committee is 400 mcg. The National PPH Prevention Task Force and other relevant stakeholders recommended the lower dose based on Bangladeshi women's shorter stature and lower weight, but whether 400 mcg effectively prevents or treats PPH has not been evaluated. Anecdotal evidence suggests the 400 mcg dosage is ineffective, meriting its re-evaluation. Single 400 mcg doses are available in individual packages for PPH prevention and treatment. Misoprostol 400 mcg is being scaled up in phases in another 18 districts. DGFP has included procurement (1.8 million pills or the equivalent of 0.9 million doses have already purchased) and distribution of Misoprostol in its operational plan (OP), and SDGs are available², and Misoprostol tablets are now included in the country's Essential Drug List (Appendix 2).

As in other developing countries, fatality rates for severe bacterial infections in neonates (neonatal sepsis) are high in Bangladesh, partially due to the unavailability, or late or inadequate administration, of necessary antibiotics^{3,4}. The UN Commission identified the three (procaine benzyl penicillin, gentamicin sulphate, ceftriaxone) most cost-effective antibiotics for neonatal sepsis. WHO recommends antibiotic treatment with procaine benzyl penicillin and gentamicin as initial therapy for presumptive treatment in newborns at risk of bacterial infection⁵. WHO recommends intramuscular injections (IM) of 50 mg/kg body weight of ampicillin (or a comparable penicillin such as procaine benzyl penicillin) every six to eight hours, depending on age, plus 7.5 mg/kg body weight of gentamicin (or another comparable aminoglycoside), divided twice daily for at least 10 days, as the standard therapy⁶. WHO also recommends, as a secondary therapy, daily injection of a single dose of ceftriaxone⁷ alone, of 50 mg/kg body weight for all newborns except those older than one week and weighing more than two kgs. In those slightly older and heavier newborns, the daily dose is increased to 75 mg/kg for 10 days.⁸

In Bangladesh amoxicillin is available in many forms—powder for suspension, drops, tablet and injection—for pneumonia treatment. Procaine benzyl penicillin, gentamicin sulphate, ceftriaxone, and amoxicillin are each registered and indicated for newborn sepsis and other life-threatening infections. Procaine benzyl penicillin, gentamicin sulphate, and amoxicillin are listed in the EDL, but ceftriaxone is not (Appendix 2). The available doses for procaine benzyl penicillin are procaine penicillin 3 lac and benzyl penicillin 1 lac/vial for IM injection; 20 mg and 80 mg of gentamycin sulphate for IM/IV injection and 250, 500, 1,000, and 2,000 mg of ceftriaxone for IM/IV injection. Amoxicillin is available in the dose forms of 100 mg/1ml drop, 125 mg/5 ml suspension, 250/500 mg/vial IM/IV injection and 250 mg/tablet dispersible tablet. SDGs are available

¹ MoHFW, OGSB, Save the Children (MaMoni project), and EngenderHealth. 2011. Guideline for prevention and management of pre-eclampsia and eclampsia at the Community. Guideline for community level service providers. EngenderHealth: Dhaka.

² MoHFW, EngenderHealth, Bangladesh and The National PPH Prevention Task Force. 2009. Guideline on Misoprostol Use in Bangladesh to prevent PPH at the Community level. EngenderHealth: Dhaka.

³ Thaver D, Zaidi AK. Burden of neonatal infections in developing countries: a review of evidence from community-based studies. *Pediatric Infectious Disease Journal*. 2009;28(S1):S3–S9.

⁴ Neonatal sepsis web page. Merck Manual website. Available at: www.merckmanuals.com/professional/pediatrics/infections_in_neonates/neonatal_sepsis.html#v1092175.

⁵ Procaine benzyl penicillin is not recommended as first-line treatment for neonatal sepsis except in settings with high neonatal mortality, when given by trained health workers in cases where hospital care is not achievable.

⁶ WHO. Management of the Child With a Serious Infection or Severe Malnutrition: Guidelines for Care at First Referral Level in Developing Countries. Geneva: WHO; 2000: 62.

⁷ WHO recommends not to administer with calcium and avoid in infants with hyper-bilirubinemia.

⁸ Saez-Llorens X, McCracken GH. Clinical pharmacology of antibacterial agents. In: Remington JS, Klein JO, eds. *Infectious Diseases of the Fetus and Newborn Infant*. Philadelphia: W.B. Saunders Company; 2001: 1419–1466.

for all four drugs. During the sixth meeting of DGHS's National Core Committee for Neonatal Health (NCC-NH) (2 September 2013) including dispersible amoxicillin tablet in the EDL was suggested⁹. Similarly, DGFP's 61st National Technical Committee (26 November 2013) approved amoxicillin dispersible tablets for the Dietary and Drug Supply (DDS) Kit¹⁰ of primary health and FP facilities for treating neonatal sepsis.

For women at risk of pre-term delivery within seven days, WHO recommends a single course of corticosteroids between 24 weeks and 34 weeks of gestation.¹¹ A single course of antenatal corticosteroids (ANCS) should be administered to women with premature rupture membranes before 32 weeks of gestation to reduce risk of pre-term respiratory distress syndrome (PTRDS), perinatal mortalities, and other morbidities. Dexamethasone sodium phosphate and betamethasone sodium phosphate are the two ANCS's recommended for accelerating fetal lung development in threatened pre-term birth. WHO, NIH, ACOG, RCOG, and WAPM list both as effective drugs for preventing complications of prematurity, using either a dosage of 24 mg of dexamethasone IM injection (4 doses of 6 mg 12 hours apart) or 24 mg of betamethasone IM injection (2 doses of 12 mg 24 hours apart)^{12,13}. As of April 2013, the 18th edition of the WHO Model List of Essential Medicines, which for the first time includes antenatal corticosteroids, lists only dexamethasone sodium phosphate for fetal indications¹⁴.

The ingredients for antenatal corticosteroids (dexamethasone sodium phosphate and betamethasone sodium phosphate) are registered in Bangladesh in different dose forms and for various indications, but not for pre-term respiratory distress syndrome (Table 3a and Table 3b). SDGs for the other indications are available, but not for pre-term respiratory distress syndrome. Dexamethasone sodium phosphate and betamethasone sodium phosphate are registered as 0.5 mg tablet, 0.1% eye drop, 0.05% eye ointment, and 5 mg injection (only dexamethasone) dose forms for various indications, but not in 6 mg dose form as injection, which is indicated for pre-term respiratory distress syndrome. Although dexamethasone and betamethasone are listed in the EDL, 6 mg dose is not. DGHS's sixth National Core Committee for Neonatal Health meeting approved introduction and scale up of 6 mg IM injection of dexamethasone for pre-term respiratory distress syndrome at the facility and community levels¹⁵. Pilot testing is ongoing in one district for assessing the feasibility and efficacy of ANCS in pre-term respiratory distress syndrome. Save the Children is working with DGHS, DGFP, and pharmaceutical companies to make the available dose form and include SDGs.

Chlorhexidine digluconate, a broad spectrum antiseptic, is commonly used worldwide for various indications. WHO added 7.1% Chlorhexidine digluconate (delivering 4% Chlorhexidine) to the 2013 Model List of Essential Medicines for Children under Specific Medicines for Neonatal Care (Section 29) for neonatal cord care. Chlorhexidine cord cleansing (7.1% chlorhexidine digluconate) should not to be confused with other Chlorhexidine interventions using Chlorhexidine gluconate, such as solution for vaginal cleansing (0.16%–0.60%), neonatal skin wiping (0.16%–0.60%), eyewash (0.05%), dental wash (0.12%), or preoperative skin cleansing (2.0%).

Chlorhexidine gluconate is registered in different dose forms for various indications in Bangladesh, but not for newborn cord care; it is listed in the EDL for the other indications (Appendix 2), with SDGs available. Although they are not effective for cord care, the available dose concentrations are widely used in Bangladesh for newborn cord cleansing. The appropriate dose form (7.1%, according to WHO) for cord cleansing has been shown to be highly effective in the region: Three community-based randomized control trials in Nepal, Bangladesh, and Pakistan resulted in Chlorhexidine cord cleansing's substantial reduction of neonatal mortality in all three countries, by 24 percent in Nepal, 20 percent in Bangladesh, and 38 percent

⁹ DGHS, MoHFW.2013. Minutes of the 6th meetings of the National Core Committee for Neonatal Health. Dhaka: DHGS.

¹⁰ DDS Kit is a box containing 26 pre-selected essential drugs, and dietary items to be dispensed by the community-based facility level service providers at UH&FWCs for patient management. Each month they receive certain number of DDS Kits from the central warehouse.

¹¹ Threatened pre-term birth can be characterized by four signs and symptoms that include i) fluid leaking from vagina (rupture membrane); ii) painful uterine contractions; iii) antepartum haemorrhage (vaginal bleeding); and iv) signs and symptoms of severe pre-eclampsia and eclampsia.

¹² WAPM: Guideline for the use of antenatal corticosteroids for fetal maturation (2008). (Xavier Miracle¹, Gian Carlo Di Renzo, Ann Stark, Avroy Fanaroff, Xavier Carbonell- Estrany¹ and Erich Saling. *J. Perinat. Med.* 36 (2008). New York.)

¹³ Cochrane summary: Antenatal corticosteroids for accelerating fetal lung maturation for women at risk of preterm birth.

¹⁴ WHO Model List of Essential Medicines, 18th list (April 2013).

¹⁵ DGHS, MoHFW.2013. Minutes of the 6th meetings of the National Core Committee for Neonatal Health. Dhaka: DHGS.

in Pakistan. Chlorhexidine cord cleansing also reduced severe cord infection by 75 percent in Nepal, 65 percent in Bangladesh, and 42 percent in Pakistan.

DGHS's sixth National Core Committee for Neonatal Health meeting, prior to the stakeholder meeting, was a turning point, at which application to all newborn umbilical stumps at birth¹⁶ of 7.1% aqueous solution of Chlorhexidine gluconate, regardless of place of birth (home or facility), was approved and listed as part of the essential neonatal care (ENC) package. The committee also suggested including 7.1% Chlorhexidine in the EDL. Similarly, DGFP's 61st National Technical Committee meeting approved Chlorhexidine 7.1% aqueous solution's inclusion in primary health and FP care facilities' Dietary and Drug Supply (DDS) Kits for newborn cord care. Save the Children is scaling it up in one district, and SDGs are being prepared. Dialogue is being initiated with reputed pharmaceutical companies to encourage the production and marketing of aqueous solution of 7.1% Chlorhexidine nationwide.¹⁷

Almost half of all newborn deaths occur within the first 24 hours, with most resulting from birth asphyxia due to intra-partum complications. This condition, manifesting as newborn failure to establish breathing after birth, is responsible for one quarter of all newborn deaths worldwide each year¹⁸. Many of these deaths could be easily prevented with basic neonatal resuscitation, which requires tactile stimulation, a neonatal bag and mask, suction device, and a resuscitation training mannequin. With this basic equipment and effective pre- and in service training, successful resuscitation of newborns is possible for about 30 percent of cases otherwise resulting in death among full term babies, and for five to ten percent of pre-term births¹⁹.



Resuscitation device

The WHO Essential Medical Devices List, which is currently being updated for priority interventions for Maternal, Neonatal and Child Health, includes neonatal resuscitators (self-inflated bag and mask), suction devices, and resuscitation training mannequins. The resuscitation device is registered in Bangladesh, but there is no Essential Medical Devices List in Bangladesh. The device has been donated by USAID in selected districts under the Helping Babies Breathe (HBB) program implemented by DGHS, ICDDR,B, and Save the Children, with technical assistance from UNICEF. SDGs are available.

Oral Rehydration Salts (ORS), introduced in Bangladesh by ICDDR,B, are widely available and in use. ORS is registered and incorporated into the EDL

for diarrheal treatment of children, with SDGs. ORS is over-the-counter, has a strong safety profile, and has no cold chain storage requirements. The standard treatment guidelines for diarrhea in Bangladesh follow the WHO-UNICEF Integrated Management of Childhood Illnesses (IMCI) guidelines. Recently, zinc sulphate monohydrate was added for diarrhea management as an adjunct therapy, as it has proven effective in reducing diarrheal episodes, as well as their duration. Zinc is registered in Bangladesh, listed in the EDL, with SDGs available. ORS in Bangladesh is available in various forms mixed with nutritional components (under brand names such as ORSaline-N, ORSaline Fruiti, Tasti Saline), while zinc sulphate monohydrate is available in tablet and syrup, a 10/20 mg/tablet or 5 ml syrup. New WHO and UNICEF formulations of ORS have Sodium Chloride 1.30 gm, Potassium Chloride 0.75 gm, TriSodium Citrate/Dye Hydrate 1.45 gm, and Glucose/Anhydrous 6.75 gm.



Service Delivery Guideline on resuscitation device

¹⁶ Guidelines suggest single application of 7.1% Chlorhexidine aqueous solution followed by dry cord care.

¹⁷ DGHS, MoHFW.2013. Minutes of the 6th meetings of the National Core Committee for Neonatal Health. Dhaka: DHGS.

¹⁸ Black, R., S. Cousens, H.L. Johnson, et al. 2010. Global, regional, and national causes of child mortality in 2008: a systematic analysis. *Lancet* 375(9730): 1969–1987.

¹⁹ Wall, S.N. et al. 2009. Neonatal resuscitation in low resource settings: what, who, and how to overcome challenges to scale up. *International Journal of Gynecology and Obstetrics* 107: S47-S64.

The female condom is not registered in Bangladesh, and policy makers and program managers believe its acceptance and use would not be significant. Contraceptive implants and emergency contraceptive pills (ECPs) are, however, registered and included in DGFP's contraceptive method mix. SDGs for these methods are available. Two types of contraceptive implants are available: a three year single rod implant with 68 mg etonogestrel, and a five year two rod implant, each containing 75 mg levonorgestrel.

In Bangladesh ECPs are an over-the-counter product manufactured by several pharmaceutical companies in the country. DGFP's 61st National Technical Committee meeting in August 2013 approved a single dose (1.5 mg) ECP regimen, instead of a two dose regimen of 0.75 mg/dose 12 hours apart, with the period of time during which women can effectively take ECPs increased to from 72 hours to 120 hours after unprotected sex. Although the drug is not listed in the EDL or in the Dietary and Drug Supply Kits for primary health care facilities, SDGs are available.



Emergency
Contraception Pill



DRUG AVAILABILITY

Government facilities and drug stores

A team visited 15 public sector facilities between August and September 2013. In-depth interviews with policy makers, program managers, and other stakeholders revealed that the 13 commodities, with the exception of female condoms, can generally be found at health facilities at district, sub-district, and primary care levels. Some drugs are not available in WHO recommended doses for maternal and neonatal indications, and drugs were not available on the day of the visit at some facilities, and shortages were reported.

TABLE 1: Maternal and neonatal health drugs and commodities available in government facilities, by facility type

Maternal and neonatal drug or commodity	Number of facilities, by type					Total (%)
	District		Sub-district		Community	
	DH	MCWC	UHC	UH&FWC	CC	
Oxytocin	1	2	4	0 ²⁰	0 ²¹	7 (47%)
Misoprostol	1	2	3	1 ²²	0	7 (47%)
Magnesium sulphate	3	1	2	0 ²³	0 ²¹	6 (40%)
Injectable antibiotics	2	0	3	0 ²⁰	0 ²¹	5 (33%)
Antenatal corticosteroid	0	0	0	0 ²⁰	0 ²¹	0 (0%)
Chlorhexidine	0	0	0	0	0	0 (0%)
Resuscitation device	2	1	3	2	0 ²⁰	8 (53%)
Amoxicillin	3	2	4	4	1	14 (93%)
ORS	3	0	4	1	1	9 (60%)
Zinc	3	1	2	1	1	8 (53%)
Female condom	-	-	-	-	-	-
Contraceptive implants	2 ²⁴	2	3	1 ²⁶	0 ²⁰	8 (53%)
Emergency contraceptive pill	0	0	0	0	0	0 (0%)
N	3	2	5	4	1	15

'0'=Not available; '-'=Never introduced; DH=District hospital; MCWC=Mother and Child Welfare Center; UHC=Upazila Health Complex; UH&FWC=Union Health and Family Welfare Center, CC=Community Clinic

²⁰ According to MoHFW policy, these centers are not allowed to provide this drug.

²¹ Service providers at this level are not allowed to administer any injectable antibiotic.

²² Misoprostol is in the process of scaling up with only 10 districts with community distribution thus far.

²³ Loading dose is approved to provide from these centers and piloting is continuing.

²⁴ These centers can provide these services only when they are designated or upgraded to provide the services.

Corticosteroids (dexamethasone sodium sulphate and betamethasone sodium sulphate) and Chlorhexidine were not found in MCWCs, UH&FWCs, and CCs. Where they were available, they were not in the right dose forms for pre-term respiratory distress syndrome or newborn cord care. Resuscitation devices were available in all facilities where health professionals and workers were trained under Helping Babies Breathe (see Table 1) in 19 districts.

Antibiotic injections (amoxicillin) in different dose forms were found in most facilities, except one UHC, and no MCWCs. (Availability of ORS, zinc sulphate, and contraceptive implants are presented in Table 1.) ECPs were not available in any facilities due to supply shortages. Although some UH&FWCs are ready to provide normal delivery services, they do not have any drugs except those in the DDS Kit (Appendix 3) such as Chlorhexidine, misoprostol, oxytocin, and MgSO₄ (Table 1).

Discussions with facility managers, service providers, and store keepers revealed that SDGs for some of the 13 commodities are lacking and providers depend on the materials provided by pharmaceutical companies. No facility received any SDG from national authorities, and providers must rely on their training and other resource materials. Providers indicated that, since their initial training on these commodities, they were able to dispense and administer them. Nurses sought support from doctors if they needed additional guidance. All visited facilities stored their drugs, including oxytocin, on shelves. Only MCWCs stored oxytocin in refrigerators.



Oxytocin stored
at room temperature

Most drugs (especially injectable or intravenous infusions) are administered by physicians and trained service providers. Most providers have pre-service training and on-the-job training on clinical decision making and drug administration. The interviews revealed that, due to a lack of coordination between drug store keepers and providers, providers are unaware of which drugs and commodities are available in facility stores. Also, many providers reported an inability to estimate the consumption rate of drugs and commodities in their facilities because they lack data.

Private pharmacies and drug stores

Twenty-seven private drug stores and pharmacies were visited in August and September 2013 at district, sub-district, and community levels to determine drug and commodity availability. At all private drug stores, the most available drugs were amoxicillin, zinc, and ORS: All drug stores and pharmacies had these drugs stocked on the day of the visit.

TABLE 2: Maternal and neonatal health drugs and commodities available in private drug stores and pharmacies, by district

Maternal and neonatal drug or commodity	District						Total (%)
	Gazipur		Zinaidah		Comilla		
	City/ Sadar	Sub-district	City/ Sadar	Sub-district	City/ Sadar	Sub- district	
Oxytocin for PPH	4	0	5	5	3	2	19 (70%)
Misoprostol for PPH	3	2	7	5	2	3	22 (82%)
Magnesium sulphate (MgSO ₄) for severe pre-eclampsia/eclampsia	2	0	5	5	0	0	12 (44%)
Injectable antibiotics for newborn sepsis	3	2	7	5	3	3	23 (85%)
Antenatal corticosteroids for PTRDS	0 ²⁵	0 ²⁵	0 ²⁵	0 ²⁵	0 ²⁵	0 ²⁵	0 (0%) ²⁵
Chlorhexidine for newborn cord care	0 ²⁵	0 ²⁵	0 ²⁵	0 ²⁵	0 ²⁵	0 ²⁵	0 (0%) ²⁵
Resuscitation devices for newborn asphyxia	0 ²⁶	0 ²⁶	0 ²⁶	0 ²⁶	0 ²⁶	0 ²⁶	0 (0%) ²⁶
Amoxicillin for pneumonia	6	3	7	5	3	3	27 (100%)
ORS for diarrhea	6	3	7	5	3	3	27 (100%)
Zinc for diarrhea	6	3	7	5	3	3	27 (100%)
Female condom	0 ²⁶	0 ²⁶	0 ²⁶	0 ²⁶	0 ²⁶	0 ²⁶	0 (0%) ²⁶
Contraceptive implants	0 ²⁷	0 ²⁷	0 ²⁷	0 ²⁷	0 ²⁷	0 ²⁷	0 (0%) ²⁷
Emergency contraceptive pill	1	1	5	5	3	2	17 (63%)
N	6	3	7	5	3	3	27

²⁵ They sell different dose forms

²⁶ Not available

²⁷ Not authorized to sell



Private drug store

Other drugs such as oxytocin, misoprostol, and $MgSO_4$ were less available. Almost all drug sellers report low demand for Oxytocin, Misoprostol, and $MgSO_4$ and that the drugs require a doctor's prescription, making their sales volumes dependent on the extent to which doctors prescribe them. Drug store keepers explained that they lose money if drugs expire while on their shelves due to slow sales, and thus they do not stock them. In 15 percent of drug stores, injectable antibiotics were not found at the day of the visit. Similarly, ECPs were not found in 37 percent of drug stores. This pattern of unavailability was similar for all city or Sadar, sub-district, and community levels. No seasonal variations were

observed except for SMC ORSaline-N: Most drug sellers indicated that the demand for Social Marketing Company's ORSaline-N peaks in summer and quickly goes off the market due to increased demand. ORS produced by other companies are available in all seasons. Dexamethasone and betamethasone and chlorhexidine are available in all drug stores, but in different dose forms and unsuitable for pre-term respiratory distress syndrome and newborn cord care, respectively. Resuscitation devices and female condoms were not available in any of drug stores. MoHFW policy does not allow private drug stores to sell contraceptive implants.

A substantial price difference was observed for all drugs according to place of manufacture, whether in Bangladesh or overseas. Drugs manufactured overseas or by foreign companies in Bangladesh are more expensive than those produced locally, while no significant differences in prices were observed among drugs manufactured in Bangladesh. According to drug sellers, the price of most drugs (except injectable antibiotics) was affordable to end users. Drug sellers were unable to rate the quality of their different products and rely on the opinions of prescribing physicians.

Maintenance of a cold chain of storage for oxytocin's stability is crucial, yet two out of nine drug stores in Gazipur district, six out of 12 in Zinaidah district, and one out of six in Comilla district stored oxytocin on shelves rather than in the refrigerators. No drug seller had a refrigerator on the premises. All other drugs were stored on shelves at room temperature as well.

LOGISTICS AND SUPPLY ORDERING

Interviews with policymakers and program managers reveal that centralized and decentralized procurement processes for commodities and logistics each exist within MoHFW. MoHFW follows the World Bank procedure for procuring drugs and commodities, through an open bidding process, whereby the lowest bidder is awarded the supply contract if they have the requisite qualifications and fulfill the specifications in the tender.

Procurement is by two separate MoHFW systems. In the public health sector, most procurement is by the Centre for Medical Store Depot, at the central level, with a few items purchased at district levels. Drugs purchased at the district level are directed by a committee of the Civil Surgeon, Resident Medical Officer, Gynecological and Obstetrics Consultant, and Surgery Consultant that estimates purchase volumes based on the previous year's utilization of the individual product. Usually, however, drugs and commodities are ordered at the national level, stored at the central warehouse, and then distributed to districts and facilities. There is no scope for local procurement, at the sub-district level, for health departments. All drugs and commodities are forecasted at the central level according to the lower level facilities' requests for each commodity.

The FP sector has an extensive process for procurement and logistics. Typically, a Director executes a need assessment of drugs and commodities based on utilization rates, includes it in the appropriate year's procurement plan, and the information is loaded to the MoHFW web portal. The Ministry provides approval for procurement and DGFP issues the tender, with a tender evaluation committee (with the Director General,



Register and reporting form

Director of Logistics and Procurement, the respective Director, and two members from the other two ministries) evaluating the subsequent proposals and ranking them on their technical and financial aspects.

The central warehouse mainly procures DDS Kits (Appendix 3), misoprostol, oxytocin, and contraceptives with the exception of ECPs. A quality control team verifies and certifies the quality of each drug and commodity according to the supply order, after which payment is made. Distribution is usually according to forms 7²⁸ and 7b²⁹ and calculated for estimated consumption in the coming three months. Each facility then receives their allocated number of DDS Kits containing 26 drugs and commodities per kit. Contraceptive forecasting and procurement occur at the central level, with storage is at the central warehouse, followed by distribution to regional warehouses and then to upazila stores, from which facilities and workers collect commodities. In all facilities including warehouses, at least one month's supply of drugs and commodities are mandated, unless there is a central shortage of a supply. Contraception and DDS Kit distribution is usually in accordance with the 'push' method, permanent methods are procured 'on demand' by facilities. All facilities record supply and use of drugs and commodities in registers. DGFP's LMIS system tracks the 13 UN commodities. SIAPS is working with DGHS to develop a similar system.

Private and NGO clinics have their own systems for commodity purchase and supply according to their needs. Private and NGO clinics can collect contraceptives from their local authorities and, if registered with the FP department, can provide FP services.

Most respondents in facilities were unaware of the national quality control guidelines and assurances. Respondents from pharmaceutical companies did, however, mention that DGDA quality control guidelines require them to have their own Standard Operating Procedures (SOPs) and ISO certifications. Service providers in facilities mentioned that end users are not willing to pay for drugs and commodities. In addition, they also mentioned low demand for oxytocin, misoprostol, MgSO₄, ANCS, zinc, and ECP.

MANUFACTURING AND DISTRIBUTION

Several domestic pharmaceutical manufacturers produce most of the 13 life-saving commodities; resuscitation devices, contraceptive implants, and female condoms are the only products not manufactured locally. In this study two manufacturers were visited, and relevant persons interviewed. The two companies visited manufacture most of the listed drugs and commodities available in Bangladesh (Table 3b). Drugs and commodities manufactured by local pharmaceutical companies are available at www.bddrugs.com. Contraceptive implants (Implanon) are imported from Organon, MSD, and Netherland, and are distributed by Janata Traders.

Resuscitation devices were donated by USAID through the Helping Babies Breathe program. Many companies do not manufacture hormonal preparations such as contraceptive pills or injectables—only one pharmaceutical company manufactures injectable contraceptives—but at least four companies produce ECPs. No pharmaceutical company produces Chlorhexidine and antenatal corticosteroids in appropriate dose forms, although they have preparations in different dose forms for other indications. Only four local companies (Table 3b) manufacture and market oxytocin, as its need for cold chain production and storage require more specialized resources and skills.

The prices of local products are regulated by DGDA. Without DGDA approval no pharmaceutical company can set a price for their drugs or commodities. Companies adhere to drug policy rules and regulations when setting their prices, which results in no excessive pricing differences for drugs produced by various domestic companies; drugs manufactured by foreign companies do not adhere to those pricing guidelines.

Pharmaceutical companies generally teach storage practices to drug distributors but not to drug stores themselves, which has resulted in deficient knowledge of correct product storage. Although there is no visible public-private partnership in pharmaceutical production, DGDA has expressed an interest in such efforts.

²⁸ Monthly issue, distribution and balanced sheet, central and regional warehouse

²⁹ Upazila monthly supply, distribution and stock balance report



Pharmaceutical company
Procedure Manual

QUALITY CONTROL AND ASSURANCE

Bangladesh's National Drug Policy requires each pharmaceutical company to have quality control (QC) and quality assurance (QA) systems for monitoring their entire manufacturing process, from acquisition of raw materials through completion to finished product. It also requires all pharmaceutical companies to have documented Standard Operating Procedures (SOPs) based on WHO-recommended current Good Manufacturing Practice guidelines for each product and unit process. These SOPs can include quality control laboratories or access to licensed medicine manufacturing facilities, equipment, qualified personnel, procedures, and references^{30,31}.

As part of the quality control program, the Bangladesh government established two drug testing laboratories in Dhaka and Chittagong districts. Findings from the interviews with drug authorities and pharmaceutical representatives reveal that these drug testing laboratories' capacities are limited both in terms of manpower and logistics: They can only can test about 30 percent of Bangladesh's 3,500 total products each year.

Every medicine available for consumption must qualify its approved standards (specifications). The standard for a medicine should be indicated in the application meaning which pharmacopoeia they would follow (e.g. British Pharmacopoeia (BP), International Pharmacopoeia (IP), United States Pharmacopoeia (USP), and European Pharmacopoeia (EPH), etc.). Recently, DGDA approved the National Pharmacopoeia, which was also approved by WHO.

As the government has limited capacity to control the quality of all drugs, it is primarily a manufacturer's responsibility to ensure quality, but DGDA is the National Regulatory Authority and is ultimately responsible for the regulation and quality assurance of all medicines. Initially, licensed manufacturers develop formulations and prepare samples of a medicine on trial and error basis in their own laboratory and test the samples following specifications of established Pharmacopoeia. They need to validate their test procedures and submit the samples to DGDA for testing and analysis in the Government Drug Testing Laboratory for registration with a certificate from their own test. The submitted samples must comply with their standard specification and passed by the Government Analyst³².

Before confirming registration of a new product, DGDA sends a team of inspectors to assess the pharmaceutical company's manufacturing facility, including their drug testing laboratories. Per public drug rules, DGDA inspects every manufacturing unit during renewal of their drug manufacturing licenses (every two years). DGDA also monitors the quality of marketed drugs by collecting samples at random from different drugstores and medicine markets and tests those drug samples in government laboratories. For imported medicines all distributors should have Free Sale Certificates of the National Regulatory Authority of at least one of the seven developed countries (UK, USA, Germany, France, Switzerland, Australia and Japan) or Good Manufacturing Practice (GMP) certificate from WHO. This procedure is followed to ensure the safety, quality, and effectiveness of the imported drug³².

If any drug sample is declared substandard by the government analyst then the production, distribution and marketing of the respective batch of the drug is immediately suspended and instructions issued to the manufacturer to withdraw the batch from all channels by publishing withdrawal notices in at least two widely circulated daily newspapers. Simultaneously, investigations by DGDA inspectors examine the root causes. DGDA also lodges a case in the Drug Court against the responsible persons of the drug manufacturer for punitive actions.

³⁰ Drug Policy of the Government of Bangladesh, MoH&FW

³¹ Quality Manual of Directorate General of Drug Administration, Bangladesh, MoH&FW

³² Quality Manual of Directorate General of Drug Administration, Bangladesh, MoH&FW

PACKAGING

Findings from the in-depth interviews indicate that separate packaging of all 13 commodities is not available. National workshop participants reiterated this fact. Many of the 13 commodities are provided in universal dose forms, and service providers must decide how much has to be given for specific MNH indications. Antibiotics for neonatal sepsis are available in various dose forms for drops, suspension, tablets, and injection, each in different concentrations not specifically packaged for neonatal sepsis, but which is simply mentioned as one of the indications on the packaging. Similarly, MgSO₄ is available in solution and power for solution forms in different concentrations. There is no separate packaging for a loading dose of 10 mg in a vial. Current available forms are 2.46 grams per 5 ml or 4 grams in per 100 ml vial, which means that four vials are required as a loading dose in the community before referral.

All respondents in the national workshop, as well as most service providers, recommend a separate single dose packaging of these essential drugs. They suggest the same for a single dose of gentamycin for neonatal sepsis. The piloting of misoprostol for PPH prevention and treatment was conducted with separate packaging specifying the indication. The same procedure is due for scale up in 18 districts. The manufacturer was instructed to make separate packaging of 400 mcg tablets (200 mcg x 2) for PPH prevention. Similarly, pharmaceutical companies are required to have separate package of misoprostol with mifepristone for the specific indication of medical termination of pregnancy, and it is now on the market. No drug is included in existing bundles such as the delivery kit but there are ongoing discussions about its inclusion. Separate packaging had enormous support from all respondents, who feel that separate packing of appropriate doses would greatly improve correct indications and doses.

FINANCING

It is government policy to supply all drugs and commodities (including FP commodities) free of cost to those securing services either at facilities or through doorstep delivery³¹. In reality, service and drugs from facilities are not free of cost, with clients encountering considerable out-of-pocket expenses. They frequently must purchase drugs from private drug stores due to supply shortages or pay informal service fees³³.

Clients are charged for services within the private sector. NGOs charge subsidized rates. All interviewed respondents, workshop participants, and public facility service providers mentioned stated that end users are not willing to pay for drugs and commodities, and the ultra poor cannot pay for anything. Drug sellers, however, are of the opinion that, in terms of health expenditures and out-of-pocket expenses, the costs of MNH drugs and commodities on the open market are within most end users' reach. The respondents also mentioned that there must be a safety net provided for the ultra poor. All respondents also felt that products should be included in conditional cash transfer coupons, vouchers, or other similar schemes, particularly the ongoing public sector maternal health voucher schemes.

ENGAGING POLICY MAKERS, PROGRAM MANAGERS, AND OTHER STAKEHOLDERS

As an initial activity of this engagement, two meetings with DGFP explored how to roll out the UN Commission recommendations. This was a follow up activity after the validation workshop that recommended forming an advocacy forum to ensure maternal and neonatal health drug and commodities are a cause that is taken up by relevant stakeholders. It was requested that Population Council take the responsibility for developing Terms of Reference of the forum. DGFP's Director of Maternal and Child Health intends to call a bigger meeting and an effort is ongoing to create this advocacy forum.

³³ Rahman, L., U. Rob, R. Mahmud, A. Alim, I.A. Hena, M.N. Talukder and H. Rahman. 2012. A pay-for-performance innovation integrating the quantity and quality of care in maternal, newborn and child health services in Bangladesh. Dhaka: Population Council.

Challenges, Opportunities, Recommendations

Interviews with policymakers, program managers, service providers, store keepers, drug sellers, and workshop participants revealed a number of challenges, opportunities, and recommendations:

CHALLENGES

- Shortages of all essential drugs and commodities in public health facilities;
- Inappropriate storage of oxytocin (and consequential use of an ineffective drug during crucial medical events) is widespread;
- Unavailability of antenatal corticosteroids in correct dose forms (6 mg injection) for pre-term respiratory distress syndrome; unavailability of Chlorhexidine in correct concentration (7.1%) for newborn cord care; provider use of inappropriate concentration; and lack of SDGs;
- Unavailability of Magnesium Sulfate in appropriate dose forms and need for manufacturing a single loading dose for severe pre-eclampsia or eclampsia, and lack of interest from pharmaceutical companies;
- Lack of advocacy with pharmaceutical companies for manufacturing less profitable but essential drugs in appropriate dose forms;
- Lack of awareness of Emergency Contraceptive Pills due to lack of educational efforts;
- Lack of knowledge and low use of zinc sulphate for neonatal diarrhea;
- Absence of a forum at DGFP that advocates for mothers and ensures access to and use of essential maternal health drugs and commodities.

OPPORTUNITIES

- All 13 drugs and commodities are registered (except the female condom) are registered in the country in different dose forms, meaning that registration for different, altered dose forms is feasible.
- The Directorate General of Drug Administration is very much in favor of ensuring the availability, quality, and affordability of essential maternal and neonatal health drugs and commodities. They requested an application for the approval of essential drugs in required dose forms. DGFP was requested to form an advocacy forum to ensure the availability of maternal health drug and commodities. Systems for Improved Access to Pharmaceuticals and Services (SIAPS) supported a Forecasting Working Group at DGFP. DGHS has a Supply Chain Coordination Forum where UN, WB, UNAIDS, MoHFW, and other stakeholders are partnered.
- Chlorhexidine has already been approved by the Directorate General of Drug Administration in appropriate concentration, and DGHS's National Core Committee for Neonatal Health and DGFP's National Technical Committee approved its use in the vertical program. Social Marketing Company has reportedly began manufacture the drug, and Save the Children is piloting its use in one district.
- DGHS's National Core Committee for Neonatal Health and DGFP's National Technical Committee have approved introduction and scale up of dexamethasone sodium sulphate 6 mg intramuscular injection for pre-term respiratory distress syndrome, for use both in facilities and within communities.
- The Directorate General of Drug Administration issued letter for appropriate storage of oxytocin in all public health facilities, and DGHS and DGFP have also issued letter to all facilities.
- Systems for Improved Access to Pharmaceuticals and Services (SIAPS) and other stakeholders are facilitating DGHS's and DGFP's quantification of the MNH commodities needed for facilities. DGFP has an LMIS system for tracking the 13 UN commodities. They have also proposed including Chlorhexidine and misoprostol in standard infant delivery kits.

- Participating respondents are concerned about the unavailability and inappropriate dose forms of MNH commodities, suggesting a wide basis of support for improved commodity availability.
- The participating respondents are concerned about the use of low dose misoprostol for PPH prevention and treatment.
- Social Marketing Company and Mayer Hashi of EngenderHealth initiated training for implant insertion and removal through private providers.

RECOMMENDATIONS

Maternal health

- Misoprostol should be bundle with birthing delivery kits.
- Advocacy with pharmaceutical companies should to manufacture a single loading dose of MgSO₄ solution.
- Participants have suggested assessing the effectiveness of 400 mcg versus 600 mcg misoprostol in preventing post-partum hemorrhage in the Bangladeshi context.
- Essential drugs and commodities for mother should be made available in Union Health and Family Welfare Centers where normal vaginal deliveries are planned and conducted.

Neonatal health

- Chlorhexidine should be bundled with birthing delivery kits.
- Resuscitation devices should be available in all districts, particularly in all facilities where deliveries are conducted.
- Advocacy should be conducted with pharmaceutical companies to manufacture single dose of gentamycin injection and 7.1% Chlorhexidine.
- Essential drugs and commodities for neonate should be made available in UH&FWCs where normal vaginal deliveries are planned and conducted.
- Single dose injectable antibiotics should be manufactured and promoted for neonatal sepsis.
- Educational efforts should be strengthened toward in increasing awareness of zinc use in diarrheal diseases.

Family Planning commodities

- DGFP should take initiatives to increase public awareness of avoiding unplanned pregnancy and ensure availability of ECPs in all facilities as well as to fieldworkers.

General recommendations

- Formation of a forum at DGFP to advocate ensuring access to and use of MNH drugs and commodities.
- Further initiatives are necessary to ensure drug quality, appropriateness of dosage, and reliable availability in both the private and public spheres.
- Directorate General of Drug Administration, DGFP, and DGHS should be regularly updated by active stakeholders on the global updates on maternal and neonatal health and other public health issues.

Table 3a: Policy, guidelines, and availability matrix of 13 life-saving maternal and neonatal health commodities in Bangladesh

Name of commodity		Registered ?	Indication?	Available dose?	Presentation?	Listed in EDL?	What is the policy?	Service delivery guidelines exist?	Availability				Storing place?		Who can administer?	Procurement?	Able to forecast supply needs?		In country manufacturing?	Quality assurance guidelines exist?	Quality control lab exists?	Stakeholder interest in roll out UN recommendation?			
									Government facility?				Private/Drug Store?				Public	Private							
									National	District	Subdistrict	Community	National	Community											
Oxytocin		Yes	-induction of labor - PPHP & treatment	5 iu/1ml ampule	im/iv Injection & Tablet	Yes	-induction of labor - PPHP	Yes	Yes	Yes ³⁴	Yes ³⁴	No	Yes	No	Freeze ³⁵	Freeze ³⁶	Physician & midwifery nurses at hospitals	Centralized ³⁷	Yes	No	Yes	Yes ³⁸	Yes ³⁹	Interested	
Misoprostol		Yes	-Anti-ulcer -Abortive - Various indications	100 mcg	Tablet	Yes	- 400 mcg for PPHP - community distribution by field workers	Yes	Yes	Yes ³⁴	Yes ³⁴	No	Yes	Vary ³⁴	Shelf	Shelf	Field workers	Centralized ³⁷	Yes	No	Yes	Yes ³⁸	Yes ³⁹	Interested	
				200 mcg																					
Magnesium Sulphate heptahydrate BP (MgSO ₄)		Yes	-prevention and treatment of SPE/E	49.3% w/v in 5 ml amp (2.46 gm) 4% w/v in 100 ml iv. Solu.	iv/im Injection and Infusion	Yes	- use in SPE/E - piloting single loading dose at community	Yes	Yes	Yes ³⁴	Yes ³⁴	No	Yes	No	Shelf	Shelf	Physician & midwifery nurses at hospitals ⁴⁰	Centralized ³⁷	Yes	No	Yes	Yes ³⁸	Yes ³⁹	Interested	
Injectable antibiotics	Procaine benzyl penicillin		Yes	- Newborn sepsis - Various indications	Procaine penicillin 3 lac -f Benzyl penicillin 1 lac/vial	Powder for im Injection	Yes	- save lives due to life threatening infections	Yes	Yes	Yes ³⁴	Yes ³⁴	No	Yes	Vary ³⁴	Shelf	Shelf	Physician & trained service providers	Centralized ³⁷	Yes	No	Yes	Yes ³⁸	Yes ³⁹	Interested
	Gentamicin sulphate			Yes	- Newborn sepsis - Various indications	20 mg 80 mg	im/iv Injection	Yes	- save lives from life threatening infections	Yes	Yes	Yes ³⁴	Yes ³⁴	No	Yes	Yes ³⁴	Shelf	Shelf	Physician & trained service providers	Centralized ³⁷	Yes	No	Yes	Yes ³⁸	Yes ³⁹
Ceftriaxone		Yes	- Newborn sepsis - Various indications	250 mg 500 mg 1 gm 2 gm	im/iv Injection	No	- save lives due to life threatening infections	Yes	Yes	Yes ³⁴	Yes ³⁴	No	Yes	Yes ³⁴	Shelf	Shelf	Physician & trained service providers	Centralized ³⁷	Yes	No	Yes	Yes ³⁸	Yes ³⁹	Interested	
Amoxicillin		Yes	- Pneumonia -various indication	100 mg/1ml 125 mg/5ml 250/500 mg/vial 250 mg/tab	Drop Susp. iv/im Injection DT	Yes	- save lives due to life threatening infections	Yes	Yes	Yes ³⁴	Yes ³⁴	Yes	Yes	Yes	Shelf	Shelf	Trained service provides	Centralized ³⁷	Yes	No	Yes	Yes ³⁸	Yes ³⁹	Already in system	
Antenatal corticosteroids (ANCS) Dexamethasone & betamethasone ⁴¹		Yes	-Various other indications	5 mg/1 ml vial and other preparation in various dose forms Not available ⁴²	im/iv/tab	Yes	-used in various indications -recently approved for PTRDS	No ⁴³	Yes	Yes ⁴⁴	Yes ⁴⁴	Yes ⁴⁴	Yes ⁴⁴	Yes ⁴⁴	Shelf	Shelf	Trained service providers	Centralized ³⁷	Yes	No	Yes	Yes ³⁸	Yes ³⁹	Interested	

³⁴ Some places it is available and some places not.

³⁵ In most places they kept it in the shelf in normal temperature.

³⁶ In most of the places they kept it in normal temperature and found in shelf.

³⁷ Centralized procurement but if needed local level can purchase it from the local market from available fund.

³⁸ Companies follow the QA guidelines of that pharmacopeias from where the drug is originated or the ingredients are purchased.

³⁹ Both public and pharmaceutical have their own quality control laboratories (QC lab). GOB has two laboratories and has limited capacity and resources to check quality of all pharmaceutical products. There are 3500 pharmaceutical products. By two QC lab GOB can check only one-third products. About 30% of the pharmaceuticals have their own QC lab and they provided QC certificate to the drug administration. It is alleged that QC measures are lacking both GOB and private companies.

⁴⁰ Trial is being conducted to administer loading dose of MgSO₄ through community based facility level service providers

⁴¹ Injection is not available.

⁴² Available dose is 5mg/1ml iv or im injection

⁴³ Available dose is 5mg/1ml are intended for various other reasons not for PTRDS. PTRDS needs 6mg im/iv dose that is not available. SDGs are being prepared.

⁴⁴ Available but not in appropriate dose form. Not in injection form.

Name of commodity		Registered ?	Indication?	Available dose?	Presentation?	Listed in EDL?	What is the policy?	Service delivery guidelines exist?	Availability				Private/Drug Store?		Storing place?		Who can administer?	Procurement?	Able to forecast supply needs?		In country manufacturing?	Quality assurance guidelines exist?	Quality control lab exists?	Stakeholder interest in roll out UN recommendation?
									Government facility?										Public	Private				
									National	District	Subdistrict	Community	National	Community										
Chlorhexidine	digluconate	No	- Neonatal umbilical cord care	7.1% not available	-	No	-recently approved for newborn cord care at facility and community -single use during umbilical cord stamp followed by dry cord care	No ⁴⁵	No	No	No	No	No	-	-	Trained service providers	-	Yes	No	Planned	-	Yes ³⁹	Interested	
	gluconate	Yes ⁴⁶	Vaginal cleansing	0.16% – 0.60%	Solution	Yes	- reduce bacterial infection in various situation -over the counter	Yes	Yes	Yes	Yes	Yes	Yes	Shelf	Shelf	Trained service providers	Centralized ³⁷	Yes	No	Yes	Yes	Yes ³⁹	-	
			Neonatal skin wiping	0.16% – 0.60%	Solution, Hand rub																			
			Eyewash	.05%	Solution																			
			Dental wash	0.12%-1%	Solu., gel																			
			Preoper. skin cleansing	2.0%	Solution																			
Resuscitation devices		Yes	- Newborn asphyxia	240 ml/500 ml size volume, specifically designed	Self-inflating bag, mask & suction devices	No	-manage newborn asphyxia	Yes	Yes	Yes ⁴⁷	Yes ⁴⁷	No ⁴⁷	Yes	No	Shelf	Shelf	Trained service providers	Donated	Yes	No	No	No	No	Interested
ORS ⁴⁸		Yes	- Diarrhea	Nacl 1.30 gm; Kcl 0.75 gm; Tri Sodium Citrate, Dye Hydrate 1.45 gm; Glucose, Anhydrous 6.75 gm ⁴⁹	Sachet	Yes	-rehydration therapy for diarrhea - over the counter	Yes	Yes	Yes	Yes	Yes	Yes	Shelf	Shelf	Over the counter product	Centralized ³⁷	Yes	No	Yes	Yes ³⁸	Yes ³⁹	Already in system	
Zinc ⁵⁰		Yes	- Diarrhea	Zinc sulphate monohydrate 10 mg/20 mg/5 ml/tab/syrup	Tablet Syrup	Yes	-prevent diarrhea -feed for 10 days - over the counter	Yes	Yes	Yes	Yes	Yes	Yes	Shelf	Shelf	Over the counter product	Centralized ³⁷	Yes	No	Yes	Yes ³⁸	Yes ³⁹	Already in system	
Female condom		No	-	-	-	-	Not interested		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Contraceptive implants (implanon/ Jadelle)		Yes	-long-term (3-5 yrs) female contraception	68 mg etonogestrel 75 mg levonorgestrel	One rod Two rods	In the method mix	-On-demand -Available at designated facility -any woman eligible even nulliparous	Yes	Yes	Yes	Yes	No ⁵¹	No ⁵²	No	Shelf	Shelf	Only trained Physician	Centralized	Yes	No	No	No	No	Already in system
Emergency contraception		Yes	-Back-up contraception	0.75 mg/ 1.5 mg/tab Levonorgestrel	Tablet	DGFP method mix	- over the counter -single dose within 5 days of unprotected sex	Yes	Yes	Yes ⁵³	Yes ⁵³	Yes ⁵³	Yes	Yes	Shelf	Shelf	Over the counter product	Centralized	Yes	No	Yes	Yes ³⁸	Yes ³⁹	Already in system

⁴⁵ One piloting is being conducted and working with MOH for the preparation and guidelines for the required concentration (7.1% chlorhexidine digluconate for cord cleansing).

⁴⁶ The ingredient is registered but the concentration required for newborn cord care is not available or registered. Various concentration and combination is available. They are all Chlorhexidine gluconate and hydrochloride not Chlorhexidine digluconate.

⁴⁷ Only in district where HBB program was implemented. In most of the places it is not available.

⁴⁸ Also available with supplements

⁴⁹ WHO & UNICEF new formulae for ORS

⁵⁰ Also available with supplements

⁵¹ In most places not available but in some places available where primary level facilities are upgraded or camps are being organized.

⁵² In a very few places it available with NGO initiatives.

⁵³ Policy is there to make it available but there is lack of supply.

Table 3b: Availability matrix of 13 life-saving maternal and neonatal health commodities in Bangladesh, by pharmaceutical companies, market retail price, available packaging, and willingness to pay by end users

Name of commodity		Name of pharmaceutical companies who manufacture it	Brand names	Available dose?	Market prices?	Separate packaging?	WTP by end-user?
Oxytocin		Nuvista Phar. Ltd., Opsonin Phar. Ltd., Chemist Laboratories Ltd., Techno Drugs	Linda-S, Ocine, Pitocin, Syntocin	5 iu/1ml ampule	Tk. ⁵⁴ 8-11/amp	No	Yes ⁵⁵
Misoprostol⁵⁶		Incepta Phar. Ltd., Gonoshasthaya Phar. Ltd., Square Phar. Ltd.	Cytomis, G-Misoprostol, Isovent	100 mcg 200 mcg	Tk. ⁵⁴ 8/ab Tk.10-15/tab	Yes ⁵⁷	Yes ⁵⁵
Magnesium Sulphate heptahydrate BP (MgSO₄)		Opsonin Phar. Ltd, Gonoshasthaya Phar. Ltd (GPL), Renata Ltd, Gonoshasthaya Phar. Ltd (GPL), Beximco Phar. Ltd.	Eclamsil 49.3%, G-Magsulph 49.3%, Magsum 49.3%	49.3% w/v in 5ml amp (2.46 gm)	Tk. 20-25/5ml amp	No	Yes ⁵⁵
Injectable antibiotics			G-Magsulph 4%, Nalepsin 4%	4% w/v in 100 ml iv. solution	Tk. 55-71/100 ml bot.		
Injectable antibiotics	Procaine benzyl penicillin	ACME Laboratories Ltd, Renata Ltd	Combipen 4 Lac, Pronapen 4 Lac	(Procaine penicillin 3 lac -f Benzyl penicillin 1 lac/vial) (1g =1 million IU) (50 mg/kg IM)	Tk. 6-10/vial	No	Yes ⁵⁵
			Pronapen 8 Lac	Procaine penicillin 6 lac, Benzyl penicillin 2 lac (total 8 lac) in 1 vial	Tk. 10/vial		
	Gentamicin sulphate	Edruc Ltd, Square Phar. Ltd., Square Phar. Ltd., Popular Phar. Ltd., Techno Drugs, Opsonin Phar. Ltd, GPL, Incepta Phar. Ltd., Beximco Phar. Ltd., Aristopharma Ltd.	Egen, Genacyn, Genacyn, Gentabac, Gentasol, Gentin, G-Gentamicin, Intamycin, Invigen	20 mg 80 mg 80 mg iv infusion	Tk. 6-7/2 ml amp Tk. 9.50-12/2 ml amp Tk. 48/100 ml vial	No	Yes ⁵⁵
	Ceftriaxone	Renata Ltd., Techno Drugs, IBN SINA Phar. Industry Ltd., Aristopharma Ltd., Beximco Phar. Ltd., ACI Ltd, Novo Healthcare and Phar. Ltd., Square Phar. Ltd., Drug International Ltd., Sanofi-aventis (Bd) Ltd., Popular Phar. Ltd., Incepta Phar. Ltd., GPL, General Phar. Ltd., Rephco Laboratories Ltd., Apex Phar. Ltd., Sandoz/Novartis (Bd) Ltd., Healthcare Phar. Ltd, Rangs Phar. Ltd., Jayson Phar. Ltd., Kemiko Phar. Ltd., Radiant Phar. Ltd., Navana Phar. Ltd., Medimet Phar. Ltd., Opsonin Phar. Ltd, Globe Phar. Ltd., Eskayef (Bd) Ltd., Ziska Phar. Ltd., ACME Laboratories Ltd., Orion Phar. Ltd., Bio-pharma Laboratories Ltd., Libra Phar. Ltd.	Ceftizone, Cefixon, Axosin, Axon, Arixon, Aciphin, Ceftrix, Ceftron, Dicephin, Enocel, Eracef, Exephin, G-Ceftriax, Imacef, Inoxon, Keptek, Megion, Oricef, Oryx, Parcef, Rit, Rofecin, Topcef, Trax, Traxon, Tribac, Triject, Triphin, Trizon, Vertex, Winner, Xylib	250 mg iv/im 500 mg iv/im 1 gm iv/im 2 gm iv/im im injections are almost same. In some cases it is Tk. 20-25 less	Tk. 75-130/vial Tk. 120-145/vial Tk. 160-195/vial Tk. 250-350/vial	No	Yes ⁵⁵
	Amoxicillin						
	Dispersible tablet (DT)	Square Phar. Ltd.	Moxacil DT	250 mg/DT	Tk. 3.50/DT tab.		
	Injection	Opsonin Phar. Ltd, Renata Ltd., Jayson Phar. Ltd., ACI Ltd., Drug International Ltd., Gonoshasthaya Phar. Ltd., Square Phar. Ltd., Acme Laboratories Ltd., Techno Drugs, Gaco Phar. Ltd.	Amoxi, Amoxon, Avlomox, Demoxil, G-Amoxycillin, Moxaci, Moxilin, Moxin, Penmox, Unimox	250 mg/vial (iv/im) 500 mg/vial (iv/im) 1000 mg/vial (iv/im)	Tk. 18-22/vial Tk. 21-27/vial Tk. 46/vial	Yes	Yes
Amoxicillin	Drop	Aexim Phar. Ltd., Ambee Phar. Ltd., Sonear Laboratories Ltd., Syntho Laboratories Ltd., Pacific Phar. Ltd., Bio Phar. Laboratories Ltd., Doctor's Chemicals Works Ltd., Renata Ltd., Cosmo Phar. Laboratories Ltd., Medicon Laboratories Ltd., Glaxo Smith Kline (Bd) Ltd, Modern Phar. Ltd., Salton Phar. Ltd., Zenith Phar. Ltd., Jayson Phar. Ltd., Rangs Phar. Ltd., Apollo Phar. Laboratories Ltd., Apex Phar. Ltd, Aristopharma Ltd., ACI Ltd., Benham Phar. Ltd., Bristol Phar. Ltd., Cosmic Chemical Industries Ltd., Kumudini Phar. Ltd., Dosh Phar. Ltd., Drug International Ltd., Hallmark Phar. Ltd., Elixir Phar. Ltd., Edruc Ltd., Popular Phar. Ltd., Sanofi-Aventis (Bd) Ltd., GPL, General Phar. Ltd., Millat Phar. Ltd., Medimet Phar. Ltd., Hudson Phar. Ltd., Ad-din Phar. Ltd., Kemiko Phar. Ltd., Asiatic Laboratories Ltd., Belsen Phar. Ltd., Amico Laboratories Ltd., Central Phar. Ltd., Proteety Phar. Ltd., Decent Phar. Ltd., Square Phar. Ltd., Nipa Phar. Ltd., Marksman Phar. Ltd., Supreme Phar. Ltd., Acme Laboratories Ltd., Opsonin Phar. Ltd, Shamsul Alamin Phar. Ltd., Mystic Phar. Ltd., Navana Phar. Ltd., Orion Laboratories Ltd., Peoples Phar. Ltd., Globex Phar. Ltd., APC Phar. Ltd., Techno Drugs, Pharmadesh Laboratories Ltd., Reman Drug Laboratories Ltd., Rasa Phar. Ltd., Rephco Laboratories Ltd., Alco Phar. Ltd., Seema Phar. Ltd., Silva Phar. Ltd., Ibn Sina	Almoxil, Ambeexin, Amocap, Amocil, Amocin, Amotid, Amotid, Amox, Amoxi, Amoxic, Amoxicap, Amoxicon, Amoxil, Amoxima, Amoxipan, Amoxizen, Amoxon, Antif, Apimox, Apoxy, Aristomox, Avlomox, Bactamox, Benoxil, Bpmox, Brodamox, Clamox, Demox, Demoxil, Dopen, Elimox, E-Mox, Fimox, Fimoxyl, G-Amoxycillin, Genamox, Hectamox, Hiconcil, Hi-Mox, J-Mox, Kamoxyl, Loxyl, Moci, Monamox, Cemoxin, Mox, Moxa, Moxacil, Moxapen, Moxatid, Moxico, Moxilin, Moxin, Mox, Mumox, Mymoxcil, Navamox, Orixyl, Pamoxil, Panoxyl, Pemox, Penmox, Pharmoxyl, Remamox, Roxyl, Remoxin,	100 mg/1ml 125 mg/1.25 ml 125 mg/5ml 250 mg/5ml 250 mg/cap 500 mg/cap 250 mg/tab 875 mg/tablet	Tk. 27-31/15 ml bot. Tk. 27-31/15 ml bot. Tk. 40-55/100 ml bot. Tk. 60-68/100 ml bot. Tk. 2.50-3.50/cap Tk. 4.50-6.50/cap Tk. 3.5-4.0/tab Tk. 8.50-10.00/tab	Yes	Yes ⁵⁵

⁵⁴ 1 US\$=80 Taka or 1 taka=US\$ 0.013

⁵⁵ If not available in the government system people purchase. But needs "safety net".

⁵⁶ Pharmaceuticals branded it as anti-ulcerant, in combination with anti-inflammatory drugs, in combination with mifepristone for medial MR

⁵⁷ Also for medical termination of pregnancy in combination with mifepristone.

Name of commodity		Name of pharmaceutical companies who manufacture it	Brand names	Available dose?	Market prices?	Separate packaging?	WTP by end-user?	
		Phar. Ind. Ltd., Eskayef (Bd) Ltd., Skylab Ltd., Beximco Phar. Ltd., Somatec Phar. Ltd., Globe Phar. Ltd., Gaco Phar. Ltd., Ziska Phar. Ltd.	Sapox, Seemaxyl, Simox, Sinamox, Sk-Mox , Skymoxin, Tycil, Tymox, Ultramox, Unimox, Zimoxyl					
Antenatal corticosteroids (ANCS)	Dexamethasone sodium phosphate	Could manufacture by all pharmaceuticals below	-	5 mg/1ml amp but 6 mg/12 mg/1ml amp not available ⁵⁸	-	-	-	
		Globe Phar. Ltd., Techno Drugs, Opsonin Phar. Ltd, Renata Ltd., Medimet Phar. Ltd., Rephco Laboratories Ltd., Globe Phar. Ltd., Techno Drugs, Renata Ltd., Medimet Phar. Ltd., Rephco Laboratories Ltd., Jayson Phar. Ltd., Chemist Laboratories Ltd., Ibn Sina Phar. Industries Ltd., Ziska Phar. Ltd., Gonoshasthya Phar. Ltd., Gaco Phar. Ltd., Nuvista Phar. Ltd., Aristopharma Ltd.	D-Cort, Decafos, Decason, Dexa, Dexam, Dexamet, D-Cort, Decafos, Decason, Dexa, Dexam, Dexamet, Dexam, Dexan, Dexon, Dextason, G-Dexamethasone, Meradexon, Oradexon, Sonexa	5 mg/1 ml amp	Tk. 9-22/amp	No	Yes ⁵⁵	
	Betamethasone ⁵⁹ sodium phosphate	Manufacture by a number of pharmaceuticals but different preparation no injection	-	Ointment, drop, cream, tablet (Glaxo)	-	No	-	
Chlorhexidine	Digluconate		Not manufacture by any pharmaceuticals	-	7.1% aqueous solution	-	No	Yes ⁵⁵
	Gluconate	Solution	Gonoshasthaya Phar. Ltd, Square Phar. Ltd., Eskayef Bangladesh Ltd., ACI Ltd, Opsonin Phar. Ltd, Silva Phar. Ltd, Silva Phar. Ltd, Medimet Phar. Ltd., Aristopharma Ltd.	G-Antiseptic, Germisol, Handirub, Hexiscrub, Hexisol, Kevirub, Safetisol, Safetisol, Safwash, Xisol, Oralon, Oralon Dental	BP solution	Tk. 16-31/100 ml bot.	No	Yes ⁵⁵
		Hand Rub			Chlorhexidine gluconate 0.5% w/w in 70% Isopropanol solutions	Tk. 24-31/50 ml bot. Tk. 80-105/250 ml bot.		
		Hand Rub			Chlorhexidine gluconate 0.5% w/v in Isopropyl alcohol 20% w/v solution	Tk. 30/50 ml bot Tk. 80/200 ml bot		
		Solution (Mouth Wash)			0.2% w/v solution	Tk. 35/100 ml bot.		
		Solution			4% solution	Tk. 100/250 ml bot.		
Resuscitation devices		NA	-	240 ml/500 ml size volume, specifically designed	NA	Not needed	No	
ORS ⁶⁰		SMC	ORSaline-N, ORS Fruti, Tasti saline	Sodium Chloride 1.30 gm; Potassium Chloride 0.75 gm; Tri Sodium Citrate, Dye Hydrate 1.45 gm; Glucose, Anhydrous 6.75 gm ⁶¹	Tk. 4.5-6.0/pack	Not needed	Yes ⁵⁵	
Zinc ⁶² Sulphate monohydrate		Acme Laboratories Ltd., Pacific Phar. Ltd., Bristol Phar. Ltd., Benham Phar. Ltd., CPL, ACI Ltd., Elixir Phar. Ltd., Eskayef Bangladesh Ltd., Edruc Ltd, GPL, Ibn Sina Ltd., Ad-din Phar. Ltd., Gaco Phar., Renata Ltd, Opsonin Phar. Ltd, NOVO Healthcare and Phar. Ltd., Aristopharma Ltd., Navana Phar. Ltd., Supreme Phar, Proteety Phar. Ltd., Orion Phar. Ltd., Nipa Phar. Ltd., Rasa Phar. Ltd., Popular Phar. Ltd., Pharmadesh Laboratories Ltd., Pharmacia Pvt. Ltd., Jayson Phar. Ltd., Beximco Phar. Ltd., Hudson Phar. Ltd., Chemist Laboratories Ltd., Cosmic Phar. Pvt Ltd., Alco Phar. Ltd., Square Phar. Ltd., General Phar. Ltd., Incepta Phar. Ltd., Globe Phar. Ltd., Zenith Phar. Ltd, Apollo Phar. Laboratories Ltd., Desh Phar. (Pvt.) Ltd., Somatec Phar. Ltd., Ziska Phar. Ltd., Ambee Phar. Ltd., Bikalpa Phar. Ltd., Bio Phar. Laboratories Ltd., Modern Phar. Ltd., Medicon Laboratories Ltd., Kumudini Phar. Ltd., Rephco Laboratories Ltd., Apex Phar. Ltd., Acme Laboratories Ltd., Chemico Laboratories Ltd., Marksman Phar. Ltd., Medimet Phar. Ltd, Drug International Ltd., Unimed & Unihealth Manufacturers Ltd., Delta Phar. Ltd, Decent Phar. Laboratories Ltd., Silva Phar. Ltd., Hallmark Phar. Ltd.,	Baby Zinc, Bimuty, Bimuty, Bp Zinc, B-Zn, C-Zinc, Dispazinc, E-Zinc, Ezy Xinc, Grow, G-Zinc, Inate, J-Zinc, Kids-B, Mazic, Nid, Novo Zinc, Oral-Z, Oralzin, Orazinc, Pedi-Z, Pem Ds, Pep-2, Peptin, Rozinc, Soluzinc, Syrup Zinc, Syrup-Zp, Tiny-Z, Xinc, Z-Dt, Zeal, Zedex, Zee-2, Zeenee, Zeenk, Zep, Zesup, Zico, Zido, Ziflu, Zikid, Zimon, Zinca, Zincep, Zincol, Zincoral, Zinc-S, Zincsy, Zinga, Zinofa, Zinon, Zinpro, Zinup, Zipol, Zis Ds, Zismo, Zisul, Zisulmet, Ziton, Zixol, Znkid, Zs, Z-Sil Dt, Z-Sil, Zym	20 mg/tab	Tk. 1.5-2.0/20 mg tab	Not needed	Yes ⁵⁵	
				10 mg/5ml syrup	Tk. 25-30/100 ml bot.			
				20 mg/5ml syrup	Tk. 50-55/100 ml bot.			
Female condom		Not available	-	-	-	-	-	
Contraceptive implants (Implanon/Jadelle)		Implanon imported from Organon. Marketed by MSD and local distributor is Janata Traders	Implanon	68 mg etonogestrel/rod	\$ 8.5-10/implant	Yes	No	
		Jadelle imported from Bayer Schering Phar. AG	(I-plant)	75 mg levonorgestrel/rod	\$ 8.0-10/two stick			
Emergency contraception		Imported from Gedeon Richter (City Overseas), and Renata Ltd., SMC, Square Phama. Ld.	Postinor-2, Emcon, Norix, Norpil I	0.75 mg/1.5 mg of Levonorgestrel/tab	Tk. 30-45/two tab	Yes	Yes ⁵⁵	

⁵⁸ Available dose is 5mg/1ml iv or im injection

⁵⁹ Injection is not available.

⁶⁰ Also available with supplements

⁶¹ WHO & UNICEF new formulae for ORS

⁶² Also available with supplements such as vitamins

Appendix 1: Bangladesh Essential Drugs List

LIST OF ESSENTIAL DRUGS		
Sl.	Name of drugs	Dosage form
1	Abacavir (ABC)	Oral Liquid, Tablet
2	Acetazolamide	Tablet
3	Acetylsalicylic acid	Suppository, Tablet
4	Aciclovir	Powder for injection, Tablet
5	Albendazole	Tablet (chewable)
6	Allopurinol	Tablet
7	Aluminium hydroxide + Magnesium hydroxide	Oral liquid, Tablet
8	Amitriptyline	Tablet
9	Amlodipine Besylate	Tablet
10	Amoxicillin	Capsule or Tablet, Powder for oral liquid, Powder for injection
11	Ampicillin	Powder for Injection
12	Anti-D immunoglobulin (human)	Injection
13	Antitetanus immunoglobulin (human)	Injection
14	Artemether + Lumefantrine*	Tablet
15	Artesunate	Injection, Tablet
16	Ascorbic Acid	Tablet
17	Atenolol	Tablet
18	Atropine	Injection, Solution (eye drops)
19	Barium Sulfate	Aqueous suspension
20	BCG vaccine	Injection
21	Benzathine benzylpenicillin	Powder for injection
22	Benzoic acid + Salicylic acid	Ointment or cream
23	Benzyl benzoate	Lotion
24	Benzyl penicillin	Powder for injection
25	Betamethasone	Ointment or cream
26	Bleomycin	Powder for injection
27	Bupivacaine	Injection
28	Calcium gluconate	Injection
29	Carbamazepine	Oral liquid, Tablet (chewable), Tablet (scored)
30	Charcoal, activated	Powder
31	Chlorambucil	Tablet
32	Chloramphenicol	Eye drops, Eye ointment
33	Chlorhexidine	Solution
34	Chloroquine	Oral liquid, Tablet
35	Chlorpheniramine	Injection , Tablet
36	Chlorpromazine	Injection, Oral liquid, Tablet
37	Ciprofloxacin	Tablet or powder for suspension
38	Cisplatin	Injection
39	Clofazimine	Capsule
40	Clotrimazole	Vaginal cream, Vaginal tablet
41	Cloxacillin	Capsule, Powder for injection, Power for oral liquid,
42	Condoms	
43	Cyclophosphamide	Powder for injection, Tablet
44	Dapsone	Tablet
45	Dexamethasone	Injection
46	Dextran 70	Injectable solution
47	Diazepam	Injection, Tablet, Tablet (scored)
48	Didanosine (ddl)	Buffered powder for oral liquid, Capsule (unbuffered enteric coated), Tablet (buffered chewable, dispersible)
49	Diethylcarbamazine	Tablet
50	Digoxin	Injection, Oral liquid, Tablet
51	Diloxanide	Tablet
52	Diphtheria antitoxin	Injection
53	Diphtheria vaccine	Injection
54	Dopamine	Injection

55	Doxorubicin	Powder for injection
56	Doxycycline	Capsule or Tablet, Tablet (dispersible)
57	DPT vaccine	Oral + Injection
58	Efavirenz (EFV or EFZ)	Capsule, Oral liquid, Tablet
59	Enalapril	Tablet
60	Epinephrine (adrenaline)	Injection, Solution (eye drops)
61	Ergocalciferol	Capsule or Tablet, Oral liquid
62	Ergometrine	Injection
63	Erythromycin	Capsule or Tablet, Powder for injection, Powder for oral liquid
64	Ethambutol	Tablet
65	Ethinylestradiol + Levonorgestrel	Tablet
66	Ferrous salt	Oral liquid, Tablet
67	Ferrous salt + Folic acid	Capsule, Tablet
68	Fluconazole	Capsule, Oral liquid
69	Fluorescein	Eye drops
70	Fluorouracil	Injection, Ointment
71	Fluphenazine	Injection
72	Folic acid	Tablet
73	Furosemide	Injection, Tablet
74	Gentamycin	Injection, Solution (eye drops)
75	Gentamycin + Hydrocortisone	Ear drop
76	Glibenclamide	Tablet
77	Gliclazide	Tablet
78	Glucose	Injectable solution
79	Glucose with sodium chloride	Injectable solution
80	Glyceryl trinitrate	Tablet (sublingual)
81	Griseofulvin	Capsule or Tablet
82	Haloperidol	Injection, Tablet
83	Halothane	Inhalation
84	Heparin sodium	Injection
85	Hepatitis B vaccine	Injection
86	Homatropine	Solution (eye drops)
87	Human normal immunoglobulin	Intramuscular administration, Intravenous administration
88	Hydrochlorothiazide	Tablet (scored)
89	Hydrocortisone	Powder for injection, Ointment or cream, Suppository
90	Hyoscine butylbromide	Tablet, Injection
91	Ibuprofen	Tablet
92	Indinavir (IDV)	Capsule
93	Insulin Injection (Soluble)	Injection
94	Isoniazide	Tablet, Tablet (scored)
95	Isoniazide + Ethambutol	Tablet
96	Isosorbide dinitrate	Tablet (sublingual)
97	Ketamine	Injection
98	Lamivudine (3TC)	Oral liquid, Tablet,
99	Levamisole	Tablet
100	Levodopa + Carbidopa	Tablet
101	Levothyroxine	Tablet
102	Lidocaine	Injection, Topical
103	Lithium Carbonate	Capsule or tablet
104	Lopinavir + Ritonavir (LPV/r)	Capsule, Oral liquid
105	Magnesium hydroxide	Oral liquid
106	Magnesium sulfate*	Injection
107	Mannitol	Injectable solution
108	Measles vaccine	Injection
109	Mebendazole	Tablet (chewable)
110	Mefloquine	Tablet
111	Metformin	Tablet
112	Methotrexate	Powder for injection, Tablet

113	Methyldopa	Tablet : 250 mg
114	Methylrosanilinium chloride (gentian violet)	Aqueous solution, Tincture
115	Metoclopramide	Injection, Tablet
116	Metronidazole	Injection, Oral liquid, Suppository, Tablet
117	Miconazole	Ointment/Cream
118	Miltefosine	Capsule/Oral liquid
119	Misoprostol	Tablet
120	Morphine	Injection, Oral liquid, Tablet, Tablet (prolonged release)
121	Naloxone	Injection
122	Nelfinavir (NFV)	Oral powder, Tablet
123	Neomycin Sulfate + Bacitracin	Ointment
124	Neostigmine	Injection, Tablet
125	Nevirapine (NVP)	Oral liquid, Tablet
126	Nicotinamide	Tablet
127	Nifedipine	Immediate release capsule
128	Nitrofurantoin	Tablet
129	Nitrous oxide	Inhalation
130	Nystatin	Oral Suspension
131	Omeprazole	Capsule
132	Oral rehydration salts	Powder
133	Oseltamivir	Tablet
134	Oxygen	Inhalation
135	Oxytocin	Injection
136	Paracetamol	Oral liquid, Suppository, Tablet
137	Paromomycin	Solution for intramuscular injection
138	Peritoneal Dialysis Solution	Intraperitoneal dialysis solution (of appropriate composition)
139	Permethrin	Cream, Lotion
140	Pertussis vaccine	Injection
141	Pethidine hydrochloride	Injection
142	Phenobarbital	Injection, Oral liquid, Tablet
143	Phenoxymethylpenicillin	Powder for oral liquid, Tablet,
144	Phenytoin	Capsule, Injection, Oral liquid, Tablet, Tablet (chewable)
145	Pilocarpine	Solution (eye drops)
146	Poliomyelitis vaccine	Oral
147	Polyvalent anti snake venom	Injection
148	Potassium chloride	Tablet, Solution
149	Povidone Iodine	Solution
150	Prednisolone	Tablet, Solution (eye drops)
151	Primaquine	Tablet
152	Procainamide	Injection
153	Procaine benzylpenicillin	Powder for injection
154	Procarbazine	Capsule
155	Proguanil	Tablet
156	Promethazine	Oral liquid, Injection, Oral liquid, Tablet
157	Propranolol	Tablet
158	Protamine sulfate	Injection
159	Pyrazinamide	Tablet, Tablet (dispersible), Tablet (scored)
160	Pyridoxine	Tablet
161	Pyrimethamine	Tablet
162	Quinine	Injection, Tablet
163	Rabies immunoglobulin	Injection
164	Rabies vaccine	Injection
165	Retinol	Capsule, Tablet, Oral oily solution, Water-miscible injection
166	Riboflavin	Tablet
167	Rifampicin	Capsule or Tablet
168	Rifampicin + Isoniazid	Tablet
169	Rifampicin + Isoniazid + Ethambutol	Tablet

170	Rifampicin + Isoniazid + Pyrazinamide	Tablet
171	Rifampicin + Isoniazid + Pyrazinamide + Ethambutol	Tablet
172	Ritonavir	Oral liquid, Oral solid dosage form
173	Salbutamol	Injection, Oral liquid, Respirator solution for use in nebulizers, Tablet
174	Salicylic acid	Solution
175	Saquinavir (SQV)	Capsule
176	Senna	Tablet
177	Silver sulfadiazine	Cream
178	Sodium chloride	Injectable solution
179	Sodium Chloride 3%	I/V fluid
180	Sodium Chloride quartet strength (0.225%) + Dextrose 5%	I/V fluid
181	Sodium Hydrogen Carbonate	Injectable solution, Soution
182	Sodium stibogluconate	Injection
183	Sodium thiosulfate	Solution
184	Spironolactone	Tablet
185	Stavudine (d4t)	Capsule, Powder for oral liquid
186	Streptomycin	Powder for injection
187	Sulfadoxine + Pyrimethamine	Tablet
188	Sulfamethoxazole + Trimethoprim	Oral liquid, Tablet, Injection
189	Suxamethonium	Injection, Powder for injection
190	Tamoxifen	Tablet
191	Tenofovir disoproxil fumarate (TDF)	Tablet
192	Tetanus vaccine	Injection
193	Tetracycline	Eye ointment
194	Thiamine	Tablet
195	Thiopental	Powder for injection
196	Trimethoprim	Tablet
197	Tropicamide	Eye drops
198	Tuberculin, purified protein derivative (PPD)	Injection
199	Valproic acid	Oral liquid, Tablet (crushable), Tablet (enteric coated)
200	Vecuronium	Injection
201	Verapamil	Injection, Tablet
202	Vinblastine	Powder for injection
203	Vincristine	Powder for injection
204	Vitamin B-Complex (Vitamin B1- 5 mg + Vitamin B2- 2 mg + Vitamin B6 - 2 mg + Nicotinamide 20 mg)	Tablet
205	Warfarin	Tablet
206	Water for Injection	Ampoule
207	Xylometazoline Hydrochloride	Nasal drops
208	Zidovudine (ZDV or AZT)	Capsule, Oral liquid, Solution for IV infusion injection, Tablet
209	Zinc sulphate	Oral liquid, Tablet

N.B: Shaded items are the drugs in the 13 life-saving commodities

Appendix 2: Contents of Drug and Dietary Supply (DDS) Kits

Annex.. XIII..

DDS Kit Contents

Sl #	Product Name	INN/Generic Name & Strength	Present Quantity in DDS Kits
1	2	3	4
1.	Tab. Iron & Folic Acid	Ferrous Fumarate (200 mg) + Folic Acid (0.20 mg) BP/USP	2000 tabs (1000 tabs in one Plastic Container) -02 Packet.
2.	Tab. Vitamin B Complex	Vitamin B Complex (Thiamine HCl- 5 mg, Pyridoxine HCl-2 mg, Riboflavin-2 mg & Nicotinamide-20 mg) BP/USP	1000 tabs (10 tabs per blister/strip) 50 blisters/Strips in one packet -02 Packet.
3.	Tab. Albendazole	Albendazole (400 mg/Tab.) BP/USP	200 tabs (1 tab per blister/strip). 50 blisters/strips in one packet -04 Packet.
4.	Tab. Paracetamol	Paracetamol (500mg/ Tab.) BP/USP	1000 tabs (10 tabs per blister/strip). 50 blisters/Strips in one packet -02 Packet.
5.	Tab. Antacid	Dried Al. Hydroxide gel (250 mg)+ Mg. Hydroxide (400mg) BP/USP	500 tabs (10 tabs per blister/strip) 25 blisters/strips in one packet -02 Packet.
6.	Tab. Drotaverine Hydrochloride	Drotaverine Hydrochloride (40mg/tab)INN	100 tabs (10 tabs per blister/strip) 10 blisters/strips in one packet.
7.	Tab. Ranitidine Hydrochloride	Ranitidine Hydrochloride (150 mg) BP/USP	300 tabs (10 tabs per blister/strip) 10 blisters/strips in one packet -03 Packet.
8.	Tab. Metronidazole	Metronidazole (400 mg/tab) BP/USP	500 tabs (10 tabs per blister) 50 blisters in one packet.
9.	Tab. Chlorpheniramine Maleate	Chlorpheniramine Maleate (4 mg/tab) BP/USP	200 tabs (10 tabs per blister) 20 blisters in one packet.
10.	Tab. Salbutamol	Salbutamol Sulphate (4 mg/tab) BP/USP	100 tabs (10 tabs per blister/strip) 10 blisters/strips in one packet.
11.	Tab. Ibuprofen	Ibuprofen (400 mg) BP/USP	100 tabs (10 tabs per blister/strip) 10 blisters/strips in one packet.
12.	Tab. Diazepam	Diazepam (5 mg/tab) BP/USP	50 tabs, (10 tabs per blister/strip) 5 blisters/ strips in one rubber band.
13.	Tab. Cotrimoxazole 120 mg (dispersible)	Sulfamethoxazole (100 mg)+ Trimethoprim (20 mg) BP/USP	300 tabs (10 tabs per blister/strip) 30 blisters/strips in one packet.
14.	Tab. Cotrimoxazole (480 mg)	Sulfamethoxazole (400 mg)+ Trimethoprim (80mg) BP/USP	500 tabs (10 tabs per blister/strip) 50 blisters/ strips in one packet.
15.	Cap. Amoxycillin	Amoxycillin Trihydrate (250 mg/Cap) BP/USP	500 tabs (10 tabs per blister/strip) 50 blister/strip in one packet.

